

Chapters 1 & 2

The chemical Basis of Life

1. **Water rises in capillaries due to**
 - A. Adhesion only
 - B. Cohesion only
 - C. Adhesion and cohesion
 - D. Evaporation
2. **Insects can walk on the surface of water due to**
 - A. Adhesion
 - B. Cohesion
 - C. Adhesion and cohesion
 - D. Evaporation
3. **Ice floats on the surface of water because of**
 - A. Expansion
 - B. Contraction
 - C. Evaporation
 - D. Surface tension
4. **Water molecules are attached together by**
 - A. Condensation
 - B. Hydrolysis
 - C. Hydrogen bonds
 - D. Covalent bonds
5. **In evaporation of water**
 - A. Hydrogen bonds are broken
 - B. Hydrogen bond are formed
 - C. Covalent bonds are broken
 - D. Covalent bonds are formed

6. In solid state a water molecule is attached to the following number of other water molecules

- A. 1
- B. 2
- C. 3
- D. 4

7. Water resists increases in temperature because the gained heat is spent in

- A. Breaking hydrogen bonds.
- B. Forming hydrogen bonds
- C. Breaking covalent bonds
- D. Forming covalent bonds

8. Water moves upward in capillaries in a continuous column due to its

- A. Thermal properties
- B. Heat of vaporization
- C. Expansion properties
- D. Adhesion properties

9. Water dissolves the following substances

- A. Polar
- B. Nonpolar
- C. Neutral
- D. Hydrophobic

10. Water is a polar molecule with

- A. Two positively charged corners and two negatively charged corners
- B. Two positively charged corners and one negatively charged corner
- C. One positively charged corner and two negatively charged corners
- D. One positively charged corner and one negatively charged corner

11. Surface tension in water is due to

- A. Adhesion
- B. Cohesion
- C. Adhesion and cohesion
- D. High specific heat capacity

12. A polysaccharide made of 5 glucose molecules has the following formula

- A. $C_5H_{10}O_5$
- B. $5CH_2O_6$
- C. $C_{30}H_{60}O_{30}$
- D. $C_{30}H_{52}O_{26}$

13. Sucrose is a

- A. Monosaccharide
- B. Disaccharide
- C. Polysaccharide
- D. Five carbon sugar

14. A polysaccharide with 20 glucose units has the following number of glycosidic bonds:

- A. 5
- B. 6
- C. 19
- D. 20

15. Condensation is the

- A. Building of bigger molecules with the removal of water
- B. Building of bigger molecules with the addition of water
- C. Breaking of bigger molecules with the addition of water
- D. Breaking of bigger molecules with the removal of water

16. Digestion involves

- A. Condensation
- B. Hydrolysis
- C. Polymerization
- D. Dehydration synthesis

17. Making starch from glucose involves

- A. Iodine test
- B. Condensation
- C. Hydrolysis
- D. Benedict solution

18. Starch can be found in

- A. Wheat cells
- B. Liver cells
- C. Epithelial cells
- D. Nerve cells

19. Glucose functions in

- A. Respiration
- B. Photosynthesis
- C. Storage
- D. As a solvent

20. A plant storage substance is

- A. Cellulose
- B. Lignin
- C. Starch
- D. Glycogen

21. Which statement is correct about proteins

- A. There are 20 different proteins
- B. All proteins are enzymes
- C. Antibodies are proteins
- D. A protein is made of 20 different amino acids in a certain sequence

22. Which of the following is correct about the test for proteins

Test	Reagent	Process	Color
A	Iodine	Add few drops	Blue black
B	Biuret	Heat	Blue
C	Sodium hydroxide and copper sulphate	Add without heating	Violet
D	Alcohol and water	Add and shake	Milky

23. One of the following shows the structural formula of a saturated fatty acid:

- A. $C_{18}H_{36}COOH$
- B. $C_{18}H_{37}COOH$
- C. $C_{20}H_{30}COOH$
- D. $C_{20}H_{36}COOH$

24. In a phospholipid molecule:

- A. The tails are hydrophobic and the heads are hydrophilic
- B. The tails are hydrophilic and the heads are hydrophobic
- C. The tails and heads are hydrophobic
- D. The tails and heads are hydrophilic

25. In a DNA molecule, a hydrogen bond connects between

- A. Phosphate and sugar
- B. Phosphate and nitrogen base
- C. Two bases
- D. Three bases

26. In RNA

- A. Ribose is connected to phosphate and a nitrogen base
- B. A nitrogen base is connected to ribose and phosphate
- C. A phosphate is connected to ribose and nitrogen base
- D. A nitrogen base is connected to two phosphate molecules

27. In RNA the two phosphate molecules are connected at the following carbon positions of ribose:

- A. 1 and 4
- B. 2 and 5
- C. 3 and 4
- D. 3 and 5

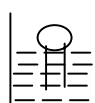
28. In a starch molecule the bond between the sugars is

- A. α -1-4 glycosidic linkage
- B. β -1-4 glycosidic linkage
- C. α -1-6 glycosidic linkage
- D. α -1-4 ester linkage

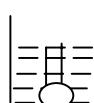
29. If a phospholipid molecule is dipped in water it will position itself as shown in the diagrams below:



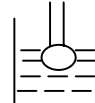
A



B

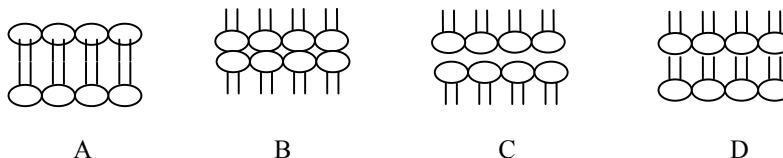


C



D

30. In the cell membrane the phospholipid molecules are arranged as shown below:



31. A saturated fatty acid has the formula: $C_{20}H_xCOOH$ what is x

- A. 20
- B. 21
- C. 40
- D. 41

32. An amino acid is characterized by

- A. An amino group
- B. A carboxyl group
- C. Both carboxyl and amino groups
- D. Peptide bond

33. A mixture of amino acids can be separated by

- A. Filtration
- B. Evaporation
- C. Chromatography
- D. Dehydration

34. A fat molecule is made of

- A. Carbon, hydrogen and oxygen
- B. 3 fatty acids and glycerin
- C. One sugar and 3 fatty acids
- D. More than one glycerol

35. DNA can be hydrolyzed into

- A. Amino acids
- B. Fatty acids and glycerol
- C. Nucleotides
- D. Sulfur groups

36. In DNA the bonds between the bases are

- A. Covalent
- B. Hydrogen

- C. Glycosidic
- D. Ester

37. An amino acid differs from a protein in that

- A. An amino acid has carboxyl and amino groups, but a protein does not
- B. A protein is a polymer but an amino acid is a monomer
- C. An amino acid is a polymer but a protein is a monomer
- D. A protein has sulfur but an amino acid does not

38. Proteins can be mostly found in

- A. Bread
- B. Meat
- C. Tomatoes
- D. Apples

39. A fatty acid is part of a

- A. Protein
- B. Amino acid
- C. Triglyceride
- D. Carbohydrate

40. Triglyceride are

- A. Hydrophobic
- B. Hydrophilic
- C. Polar
- D. Charged

41. Fructose is

- A. An amino acid
- B. Dipeptide
- C. Monosaccharide
- D. Disaccharide

42. Phosphorus is a constituent of

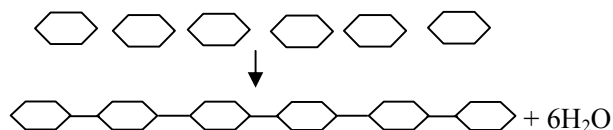
- A. Phospholipids and proteins
- B. ATP and NAD
- C. RNA and glucose
- D. Amino acids and proteins

43. Sulfur is a constituent of

- A. Some proteins
- B. Nucleotides
- C. Monosaccharides
- D. Fatty acids

44. Turgidity in plant cells is due to the following property of water

- A. Capillary action
- B. Heat capacity
- C. Incompressibility
- D. *Transparency*



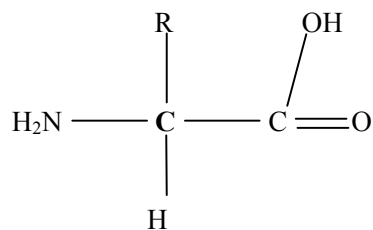
45. The above reaction illustrates

- A. Oxidation
- B. Reduction
- C. Hydrolysis
- D. Condensation

46. The storage carbohydrate in liver and muscles is

- A. Cartilage
- B. Collagen
- C. Glycogen
- D. Starch

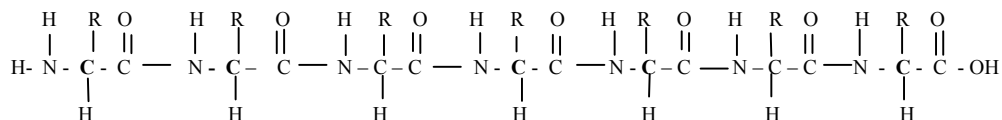
47. The following group is a monomer of



- A. Polysaccharides
- B. Lipids

- C. Proteins
- D. Nucleic acids

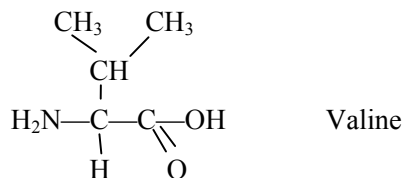
48. How many amino acids does the following polypeptide contain?



- A. 3
B. 4
C. 5
D. 7

49. Keratin is present in hair and skin; and collagen, is present in tendons, cartilage and bones. Keratin and collagen are proteins in their

- A. Primary structure
- B. Secondary structure
- C. Tertiary structure
- D. Quaternary structure



50. The above diagram shows the structure of valine, one of the amino acids. According to its R group, this amino acid is considered

- A. Hydrophilic
B. Hydrophobic
C. Polar
D. Water soluble

Chapter 3

Enzymes

1. Choose the correct statement

- A. Enzymes fit into the active site of the substrate
- B. The substrate fits into the active site of the enzyme
- C. The substrate and the enzyme both have active sites
- D. The location of the active site depends on the type of reaction

2. Choose the correct statement

- A. The higher the temperature the faster the rate of reaction
- B. As the temperature increases more substrate is formed
- C. As the temperature increases more active sites are produced
- D. Temperature affects the shape of the active site

3. Enzymes are

- A. Proteins in their primary structure
- B. Proteins in their tertiary structure
- C. Carbohydrates in their primary structure
- D. Carbohydrate in their tertiary structure

4. Increasing the substrate concentration

- A. Increases the amount of product
- B. Increases the amount of enzyme
- C. Increases the number of active sites
- D. Decreases the amount of product

5. Denaturation of an enzyme

- A. Can be reversed by lowering the temperature
- B. Can be reversed by freezing below 0°C
- C. Changes the enzyme active site
- D. Changes the substrate active site

6. A competitive inhibitor

- A. Changes the tertiary structure of the enzyme
- B. Denatures the enzyme

- C. Attaches to the active site of the enzyme
- D. Attaches to the substrate

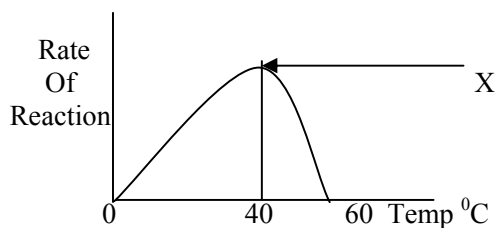
7. A competitive inhibitor

- A. Increases the rate of enzymatic reactions
- B. Decreases the rate of enzymatic reactions
- C. Does not affect the rate of enzymatic reactions
- D. Can increase or decrease the rate depending on temperature

8. An allosteric inhibitor is

- A. Irreversible in its action
- B. Reversible in its action
- C. Fits into the active site of the enzyme
- D. Destroys the allosteric site of the enzyme

9. The graph below represents the effect of temperature on enzyme catalyzed reactions:



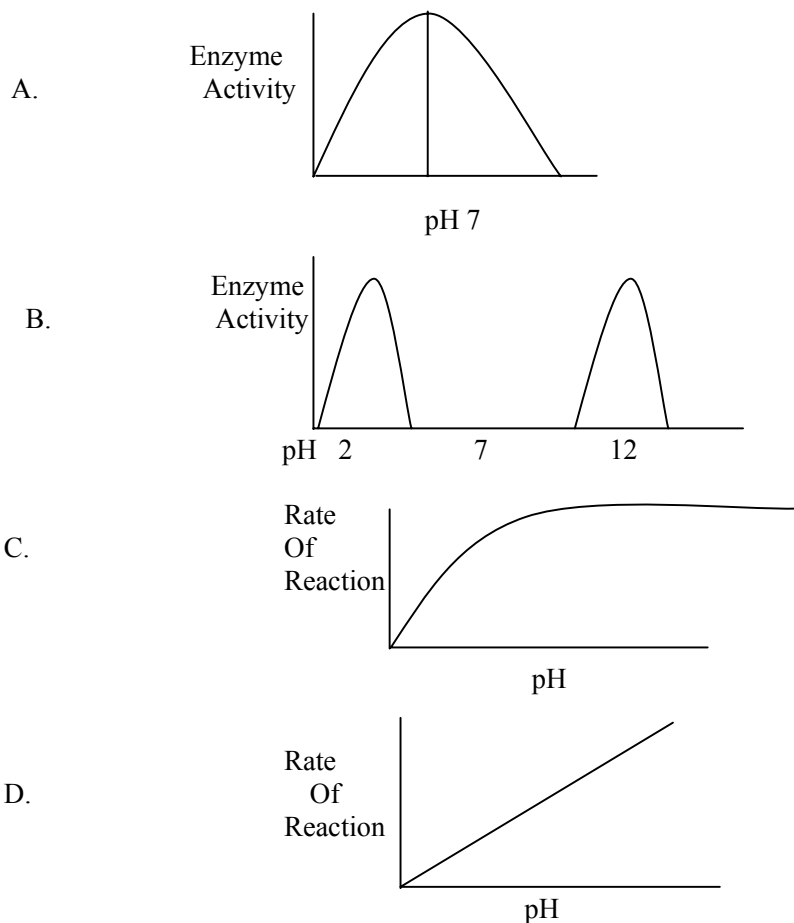
What can be limiting the rate of reaction at X?

- A. Temperature
- B. Pressure
- C. Light
- D. Substrate concentration

10. In exergonic reactions:

- A. The energy of reactants is higher than that of the products.
- B. The energy of the products is higher than that of the reactants
- C. The activation energy of the enzyme is higher than that of the products
- D. The activation energy of the products is higher than that of the enzyme

11. Which of the following graphs shows the effect of pH on most enzymes:



12. Enzymes

- A. Lower the activation energy
- B. Increase the activation energy
- C. Provide the activation energy
- D. Absorb the activation energy

13. The activation energy is

- A. The energy needed to activate the enzyme
- B. The energy needed to activate the products
- C. The energy needed to activate the reactants
- D. The energy needed to stop the inhibitors

14. Heavy metals can act as

- A. Competitive inhibitors
- B. Allosteric inhibitors

- C. Allosteric activators
- D. Irreversible inhibitors

15. Allosteric inhibitors fit into the

- A. Active site of the substrate
- B. Active site of the enzyme
- C. Allosteric site of the substrate
- D. Allosteric site of the enzyme

16. In enzymatic reactions

- A. The enzyme comes out unaffected
- B. The substrate comes out unaffected
- C. The Product is destroyed
- D. The enzyme is destroyed

17. Catalase is an enzyme that Breaks

- A. Water into oxygen and hydrogen
- B. Yeast into oxygen and water
- C. Glycogen into glucose
- D. Hydrogen peroxide into water and oxygen

18. When hydrogen peroxide is applied on a wound as a disinfectant, gas starts to bubble out from the broken skin tissue. This gas is

- A. Oxygen
- B. Nitrogen
- C. Carbon dioxide
- D. Hydrogen

19. An element present in lactase but not in lactose is

- A. Carbon
- B. Hydrogen
- C. Nitrogen
- D. Oxygen

20. In an experiment on enzymes, hydrogen peroxide is added to a yeast suspension. Yeast is used as a source of

- A. Catalase
- B. Water

- C. Carbon dioxide
- D. Oxygen

21. Allosteric inhibitors

- A. Are needed for control of reactions
- B. Are harmful to the body
- C. Destroy enzymes
- D. Destroy substrates

22. A competitive inhibitor

- A. Has an active site similar to that of the substrate
- B. Has an active site similar to that of the enzyme
- C. Is similar to the enzyme
- D. Is similar to the substrate

23. Cyanide is a

- A. Competitive inhibitor
- B. Non competitive inhibitor
- C. Allosteric inhibitor
- D. Enzyme cofactor

24. Enzymes can be manufactured by

- A. Genetic engineering
- B. Hydrolysis
- C. hydrogenation
- D. Dehydration

25. Enzymes are needed in small amounts because

- A. They are not often required in the cell
- B. They can multiply when they are needed
- C. They are toxic to the cell
- D. They are not affected by the reaction

26. The induced fit hypothesis implies that

- A. An enzyme has a fixed solid active site
- B. The substrate fits the active site like a lock and a key
- C. The active site changes in order to fit its substrate

D. The active site cannot change

27. The induced fit hypothesis explains why

- A. Some enzymes might catalyze the reaction of more than one substrate
- B. Enzymes can work with one substrate only
- C. The substrate fits into one kind of enzyme
- D. Irreversible inhibitors destroy enzymes

28. In reactions involving competitive inhibition, the rate of reaction is controlled by all of the following except

- A. The concentration of substrate
- B. The concentration of inhibitor
- C. The concentration of enzymes
- D. Allosteric sites

29. An enzyme can be denatured by all of the following except

- A. High temperature
- B. Freezing
- C. High pH
- D. Presence of salts

30. To test for the presence of enzymes, the following can be used

- A. Benedict test
- B. Biuret test
- C. Adding ethanol
- D. Adding iodine

31. When ATP accumulates, it exerts an inhibitory effect on the enzyme phosphofructokinase. ATP binds to a site other than the active site of this enzyme. In this process ATP is considered as a:

- A. Competitive inhibitor
- B. Non-competitive inhibitor
- C. Irreversible inhibitor
- D. Activator

32. Para-aminobenzoic acid is one of the compounds in the metabolic pathways of bacterial cells. We take a medicine called sulfanilamide to stop bacterial activity.

This substance is similar in its structure to para-aminobenzoic acid. What would be the effect of sulfanilamide in this metabolic pathway

- A. It competes with the enzyme involved in the conversion of para-aminobenzoic acid into its product
- B. It competes with para-aminobenzoic acid on the active site of the enzyme
- C. It is an irreversible inhibitor
- D. It is an allosteric inhibitor

33. Denaturation of enzymes by heat is

- A. Reversible
- B. Irreversible
- C. Exothermic
- D. Allosteric

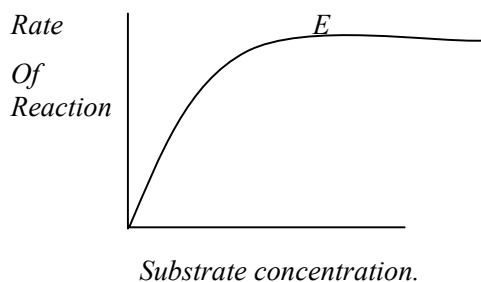
34. The head of a man who lived 2,000 years ago was found in a peat bog in Denmark. The remarkable preservation of his face features was due to

- A. Enzymatic inhibition by acidity
- B. The presence of irreversible inhibitors
- C. The presence of competitive inhibitors
- D. The presence of allosteric inhibitors

35. The denaturation of an enzyme by heat is due to

- A. A change in the shape of the polypeptide chain
- B. A change in pH
- C. The formation of allosteric sites
- D. The evaporation of water

The following diagram shows the effect of substrate concentration on enzyme activity



36. What is happening at point E

- A. The enzyme has expired

- B. The reaction has stopped
- C. All the enzyme active sites are occupied
- D. All the substrate active sites are occupied

37. In feedback inhibition, the reaction is inhibited by

- A. Increased temperature
- B. Increased products
- C. Increased pH
- D. Addition of enzymes

38. Enzymes are needed in small amounts because they

- A. Can be denatured easily
- B. Are not changed by the reaction
- C. Can be formed continuously
- D. Can replicate

39. Enzymes are specific because

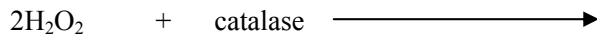
- A. They have a specific active site
- B. They work at a specific pH
- C. They work at a specific temperature
- D. They need specific cofactors

40. In enzymatic reactions, the substrate

- A. Is produced at the end of the reaction
- B. Is changed during the reaction
- C. Competes with the enzyme
- D. Competes with the product

41. The activation energy is needed

- A. Only in exergonic reactions
- B. Only for endergonic reactions
- C. In exergonic and endergonic reactions
- D. For activating the inhibitors



42. The products of the above reaction are

- A. Yeast
- B. Hydrogen and oxygen
- C. Hydrogen and water
- D. Oxygen and water

43. Inactivation of an enzyme by freezing is

- A. Irreversible
- B. Reversible
- C. Similar to denaturation
- D. A factor that causes enzyme inhibition

44. Immobilized enzymes are

- A. Inactivated enzymes
- B. Denatured enzymes
- C. Reversible enzymes
- D. Enzymes stuck on a certain material

45. Cyanide is

- A. An allosteric inhibitor
- B. Reversible inhibitor
- C. Competitive inhibitor
- D. Irreversible inhibitor

46. Allosteric inhibitors

- A. Are poisonous to the body
- B. Are needed in the body
- C. Increase the rate of reaction
- D. Irreversible

47. Competitive inhibitors fit into the

- A. Allosteric site of the enzyme
- B. Allosteric site of the substrate
- C. Active site of the enzyme
- D. Active site of the substrate

48. The shape of active site depends on the following bonds between the amino acids of the protein

- A. Hydrogen bonds only
- B. Disulphide bridges only
- C. Electrovalent bonds only
- D. All of the above bonds

49. One of the following molecules can act as a coenzyme

- A. ATP
- B. ADP
- C. NAD
- D. RNA

50. Coenzymes are made of

- A. Carbohydrates
 - B. Nucleotides
 - C. Proteins
 - D. Lipids
-

Chapter 4

Cells

1. Mitochondria can be found in

- A. Animal cells only
- B. Animal and plant cells only
- C. Prokaryotes
- D. Prokaryotes and plant cells

2. Cilia and flagella are made of

- A. Centrioles
- B. Membranes
- C. Ribosomes
- D. Microtubules

3. Ribosomes are found

- A. Only in eukaryotes
- B. In prokaryotes
- C. In viruses
- D. In animal cells only

4. Ribosomes function in

- A. Destruction of foreign materials
- B. Making rough endoplasmic reticulum
- C. Manufacturing proteins
- D. Releasing hydrolytic enzymes

5. Cellulose cell wall can be found

- A. In plant cells and bacteria
- B. In all eukaryotes
- C. In prokaryotes
- D. In plant cells

6. The sap vacuole functions in

- A. Support
- B. Transport

- C. Protein synthesis
- D. Sugar synthesis

7. A large number of lysosomes could be found in

- A. Epithelial cells
- B. Red blood cells
- C. White blood cells
- D. Platelets

8. A plasmid can be found in

- A. Red blood cells
- B. White blood cells
- C. Bacterial cells
- D. Plant cells

9. Which of the following cell structures is surrounded by or made of a single membrane

- A. Mitochondria
- B. Chloroplasts
- C. Cell membrane
- D. Nuclear membrane

10. What is the function of cisternae

- A. Protein synthesis
- B. Protein packaging
- C. Modification of proteins into the final products
- D. Breakdown of proteins

11. Lysosomes function in

- A. Digestion and respiration
- B. Feeding and defence
- C. Digestion and movement
- D. Feeding and respiration

12. DNA can be found in the eukaryotic cell in the

- A. Nucleus only
- B. Mitochondria only
- C. Golgi complex

D. Chloroplasts

13. Ribosomes are not present in

- A. Prokaryotes
- B. Eukaryotes
- C. Mitochondria
- D. Golgi complex

14. Centrioles are found in

- A. Prokaryotes
- B. Plant cells
- C. Animal cells
- D. Mitochondria

15. Which of the following correctly describes the organelle shown in the table

Organelle	Description	Function	Where it is found
A. Mitochondria	Surrounded by two smooth membranes	Respiration	All types of cells
B. Chloroplasts	Surrounded by outer smooth and inner folded membranes	Photosynthesis	Eukaryotes only
C. Golgi complex	A group of membranes and vesicles	Modification of proteins	Eukaryotic cells only
D. Centrioles	Folded membranes	Cell division	Animal cells only

16. Starch grains can be found in

- A. Mitochondria
- B. Chloroplasts
- C. Golgi complex
- D. Nucleus

17. The largest number of mitochondria can be found in

- A. Sperm cell
- B. Red blood cell
- C. White blood cell

- D. Epithelial cell

18. Lysosomes are involved in

- A. Respiration
- B. Transport
- C. Protein synthesis
- D. Digestion

19. The Golgi complex functions in

- A. Respiration
- B. Photosynthesis
- C. Protein synthesis
- D. Protein secretion

20. Prokaryotes have all the following structures except

- A. Ribosomes
- B. Rough endoplasmic reticulum
- C. DNA
- D. Cell membrane

21. The resolution power of the light microscope is

- A. 0.1 nm
- B. 0.1 mm
- C. 0.5 mm
- D. 0.2 μm

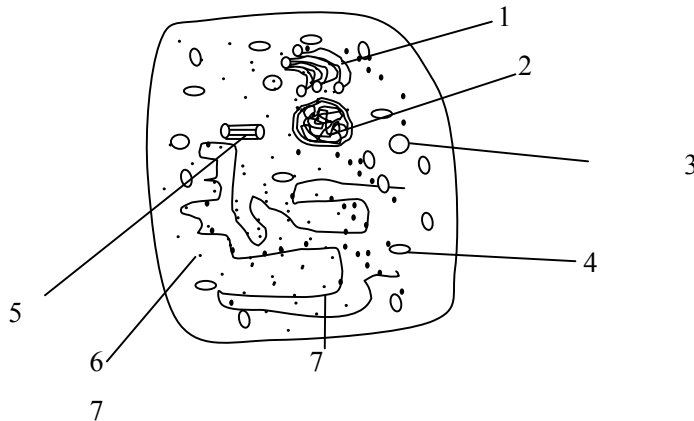
22. Cells divide

- A. To Increase their surface area
- B. Decrease their surface area
- C. Release extra material
- D. Get rid of old material

23. A virus can contain the following structure

- A. RNA
- B. Cell wall
- C. Ribosomes
- D. Nucleus

Study the diagram below then answer questions 24&25



24. The functions of structures 3 and 5 are

- A. Digestion and mitosis
- B. Digestion and protein synthesis
- C. Transport and excretion
- D. Transport and secretion

25. Microtubules are present in

- A. 4
- B. 5
- C. 6
- D. 7

26. Proteins are modified into the final product by

- A. 1
- B. 2
- C. 3
- D. 4

27. Scientists think that eukaryotes evolved from prokaryotes by

- A. Cytokinesis
- B. Endosymbiosis
- C. Exocytosis
- D. Cell division

28. The resolution power of a microscope is its ability to

- A. Enlarge objects
- B. Show the details of objects

- C. Resolve the amount of light
- D. Magnify beyond the resolving power of the microscope

29. The scientist who observed unicellular organisms moving in a drop of pond water

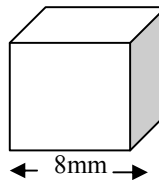
and called them animalcules is

- A. Jansen
- B. Robert Hooke
- C. Leeuwenhoek
- D. Schleiden

30. The scientist who showed that living cells arise from other cells by cell division is

- A. Purkinje
- B. Schleiden
- C. Virchow
- D. Schwann

31. In the following cube the surface area to volume is



- A. 64
- B. 48
- C. 0.75
- D. 0.50

32. The ribosomes in bacteria are

- A. 70 S
- B. 80 S
- C. Membrane bound
- D. Attached to the naked DNA

33. Chloroplasts and bacteria are similar in that they both have

- A. DNA
- B. RER
- C. Double membrane
- D. Lysosomes

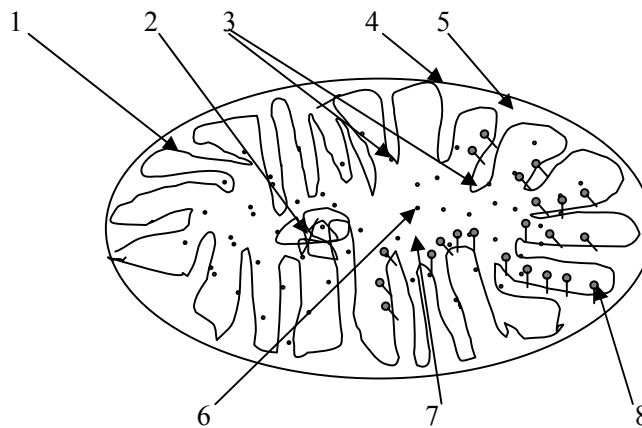
34. Mitochondria and chloroplasts are similar in that they both have

- A. RER
- B. Ribosomes
- C. Cristae
- D. Cisternae

35. A prokaryote can have a maximum of

- A. One boundary
- B. Two boundaries
- C. Three boundaries
- D. Four boundaries

In the following diagram of a mitochondrion, answer questions 36-38



36. Structures 2, 3, and 4 respectively are:

- A. DNA, thylakoids, outer membrane
- B. Thylakoid, DNA, nuclear envelope
- C. DNA, cristae, outer membrane
- D. RER, cisternae, cell membrane

37. Structures 6, 7 and 8 are:

- A. Matrix, cytoplasm, thylakoid
- B. Ribosome, stroma, DNA
- C. Ribosome, matrix, enzyme
- D. Ribosome, cytoplasm, DNA

38. Structures 3, 4 and 5 are:

- A. Cristae, outer membrane, intermembrane space
- B. Villi, cell membrane, cytoplasm

- C. Microvilli, nuclear membrane, cytoplasm
- D. Cisternae, vacuole, cell sap

39. Nitrogen fixing bacteria in the nodules of legumes is a

- A. Parasite
- B. Endosymbiont
- C. Predator
- D. Mitochondrial structure

40. The DNA of a bacterium is

- A. Associated with histones
- B. Has double nuclear membrane
- C. Has ribosomes
- D. Not surrounded by a nuclear envelope

41. Grana are

- A. Stacks of ribosomes
- B. Stacks of thylakoids
- C. Present in mitochondria
- D. Involved in respiration

42. Cristae are

- A. Involved in respiration
- B. Involved in photosynthesis
- C. Contain lysosomes
- D. Produce DNA

43. Cellulose is made of

- A. Amino acids
- B. Glucose monomers
- C. Glycosidic bonds
- D. Lignin fibers

44. The largest number of Golgi apparatus would be found in

- A. Epithelial cells
- B. Salivary cells
- C. Blood cells
- D. Epidermal cells

45. One of the pieces of evidence that eukaryotes developed from prokaryotes is the presence of the following structures in the chloroplasts

- A. Nuclear envelop
- B. Golgi apparatus
- C. Lysosomes
- D. Double membrane

46. The common features between prokaryotes and chloroplasts are

- A. Presence of nuclear envelope
- B. Presence of ribosomes
- C. Absence of DNA
- D. Absence of double outer membrane

47. The common features between prokaryotes and eukaryotes are:

- A. Ribosomes, DNA and nuclear envelope
- B. Ribosomes, DNA and histones
- C. Endoplasmic reticulum, ribosomes and cytoplasm
- D. Ribosomes, DNA and cell membrane

48. The largest amount of glycogen granules can be found in

- A. Epithelial cells
- B. Salivary cells
- C. Blood cells
- D. Liver cells

49. Lysosomes function in

- A. Enzyme synthesis
- B. Release of proteins
- C. Phagocytosis
- D. Modification of proteins

50. A slimy capsule can be found in

- A. Prokaryotes and plant cells
- B. Prokaryotes only
- C. Plant and animal cells
- D. Prokaryotes and animal cells

Chapter 5

Cell membrane and Transport

- 1. In active transport molecules pass through the following part of the cell membrane**
 - A. Protein channels
 - B. Phospholipid bilayer
 - C. Phosphate heads
 - D. Cholesterol tails
- 2. In the structure of the cell membrane, glycoproteins are**
 - A. Carbohydrate chains attached to membrane proteins
 - B. Protein tails attached to phospholipids
 - C. Carbohydrate tails attached to phospholipids
 - D. Protein tails attached to cholesterol
- 3. Active transport is controlled by**
 - A. The concentration gradient
 - B. Nature of transported substance
 - C. Amount of water
 - D. Amount of solute
- 4. Cells engaged in active transport have a high number of**
 - A. Golgi complex
 - B. Mitochondria
 - C. Lysosomes
 - D. Ribosomes
- 5. In endocytosis vesicles formed around the engulfed particles are formed by**
 - A. Endoplasmic reticulum
 - B. Nuclear envelope
 - C. Lysosomes
 - D. Cell membrane
- 6. In protein secretion the protein is moved to the outside of the cell in the following sequence**

- A. Cisternae, vesicles, Golgi complex, cell membrane
- B. Golgi apparatus, endoplasmic reticulum, ribosomes, cell membrane
- C. Cisternae, endoplasmic reticulum, ribosomes, Golgi complex
- D. Ribosomes, cisternae, nuclear envelope, cell membrane

7. Pinocytic vesicles can be found in

- A. Wheat cells
- B. Potato cells
- C. Liver cells
- D. Bacteria

8. The thyroid gland can concentrate iodine to a level higher than that of the blood, this is an example of

- A. Diffusion
- B. Osmosis
- C. Active transport
- D. Phagocytosis

9. The concentration of sodium outside a nerve cell is higher than inside, this is an example of

- A. Diffusion
- B. Osmosis
- C. Active transport
- D. Phagocytosis

10. ATP is needed in the case of

- A. Pinocytosis
- B. Diffusion
- C. Osmosis
- D. Facilitated diffusion.

11. In osmosis, water molecules can pass through the selectively permeable membrane but not the solute because they are different in

- A. Size
- B. Kinetic energy
- C. Speed
- D. Concentration

12. If pieces of potato are placed in a hypotonic solution, they will

- A. Shrink
- B. Increase in weight
- C. Decrease in weight
- D. Stay the same

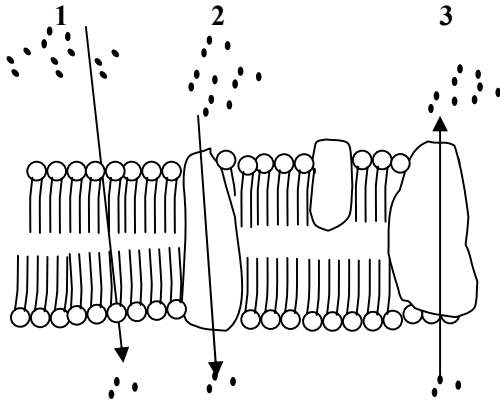
13. Support in herbaceous plants such as grass is mainly due to

- A. Lignin
- B. Pectin
- C. Wood
- D. Turgidity

14. The speed of osmosis can increase by increasing

- A. ATP
- B. Protein channels
- C. Concentration gradient
- D. Vesicles

Study the following diagram, then answer questions 15-17



15. Molecules represented by 1 could most probably be

- A. Sodium ions
- B. Potassium ions
- C. Proteins
- D. Water

16. Arrow 2 can best represent

- A. Simple diffusion
- B. Facilitated diffusion

- C. Pinocytosis
- D. Osmosis

17. Arrow 3 can represent

- A. Simple diffusion
- B. Facilitated diffusion
- C. Active transport
- D. Osmosis

Study the following diagram, then answer questions 18-25

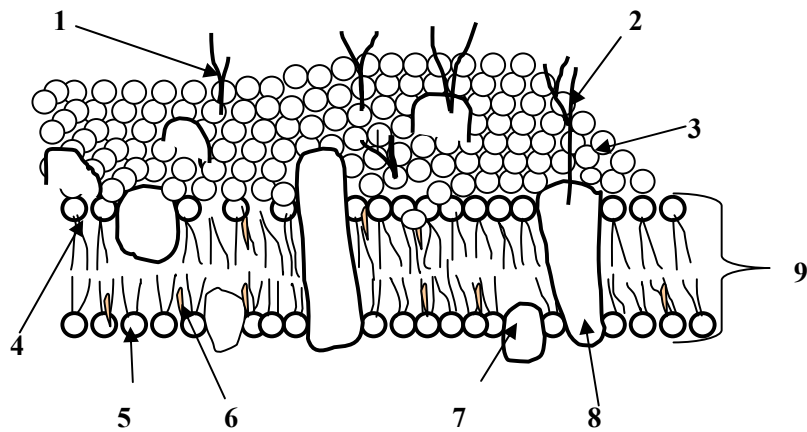


Diagram showing structure of the cell membrane

18. Arrow 2 is pointing at

- A. Glycoprotein
- B. Glycolipid
- C. Fatty acid tail
- D. Cholesterol

19. Arrow 8 is pointing at

- A. Vesicle
- B. Pinocyte
- C. Glycoprotein
- D. Glycolipid

20. Structures 1 and 2 are attached to the

- A. Inner side of the membrane
- B. Outer side of the membrane

- C. Inner and outer side of the membrane
- D. Only to mitochondrial membranes

21. Arrow 6 is pointing to a

- A. Protein channel
- B. Protein gate
- C. Carbohydrate
- D. Cholesterol

22. Structure 8 mostly allows the following substances to pass through

- A. Hydrophilic
- B. Hydrophobic
- C. Neutral
- D. Uncharged

23. Structure 9 allows things to pass

- A. With the gradient
- B. Against the gradient
- C. In any direction
- D. Inwards only

24. Facilitated diffusion can occur through

- A. 4
- B. 6
- C. 8
- D. 9

25. Oxygen passes mainly through

- A. 6
- B. 7
- C. 8
- D. 9

26. The outer side of the membrane differs from the inner by the fact that the outer side contains:

- A. Cholesterol
- B. Hydrophilic phosphate groups

- C. Hydrophobic phosphate groups
- D. Glycoproteins

27. Cilia and flagella are made of

- A. Actin filaments
- B. Myosin filaments
- C. Microtubules
- D. Muscle fibers

28. In eukaryotic cells DNA molecules can be found in the

- A. Nucleus and cytoplasm
- B. Nucleus and vacuole
- C. Mitochondria
- D. Mitochondria and Golgi complex

29. Movement of water in xylem tubes is an example of

- A. Osmosis
- B. Diffusion
- C. Active transport
- D. Bulk flow

30. Osmosis is the movement of water from

- A. Lower to higher osmotic potential
- B. Concentrated to dilute solution
- C. Hypertonic to hypotonic solutions
- D. Low water potential to higher water potential

31. Active transport is the movement of molecules

- A. Against the gradient through the phospholipid bilayer
- B. With the gradient through the phospholipid bilayer
- C. Against the gradient through membrane proteins
- D. With the gradient through membrane proteins

32. The sodium potassium pump maintains a

- A. High concentration of potassium outside and high concentration of sodium inside
- B. Low concentration of potassium and high concentration of sodium outside
- C. High concentration of sodium and potassium outside the cell

- D. Low concentration of sodium and potassium outside the cell

33. Wilting in plants is caused by

- A. Increase in turgidity
- B. Decrease in turgidity
- C. Gain of water
- D. Gain of solutes

34. The molecules transported by carrier assisted transport are usually

- A. Hydrophilic
- B. Hydrophobic
- C. Nonpolar
- D. Fat soluble

35. Facilitated diffusion carries molecules

- A. From higher to lower concentration through the phospholipid bilayer
- B. From lower to higher concentration through the phospholipid bilayer
- C. From lower to higher concentration through the protein channels
- D. From higher to lower concentration through the protein channels

36. Feeding in amoeba is an example of

- A. Pinocytosis
- B. Phagocytosis
- C. Exocytosis
- D. Osmosis

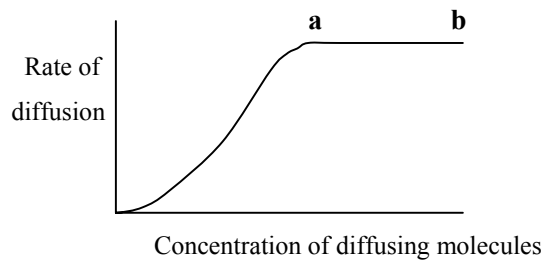
37. Haemoglobin is considered a conjugated protein because

- A. It has 4 polypeptide chains
- B. It carries oxygen
- C. It has a haem group
- D. It has a disulfide linkage

38. A competitive inhibitor

- A. Is harmful to metabolic reactions
- B. Needed for normal body function
- C. Similar to the enzyme in their structure
- D. Compete with enzymes for the substrate

39. The following graph shows the rate of facilitated diffusion versus the concentration of diffusing molecules



What causes the rate of diffusion to stabilize between points a and b?

- A. The thickness of the protein molecules
- B. The limited supply of ATP
- C. The limited number of transport proteins
- D. The limited number of mitochondria

40. One of the factors affecting the rate of simple diffusion is

- A. Temperature
- B. ATP
- C. Number of protein channels
- D. Enzyme inhibitors

41. In phagocytosis, the material engulfed is destroyed by the

- A. Golgi complex
- B. Mitochondria
- C. Ribosomes
- D. Lysosomes

42. Molecules passing through the phospholipid bilayer are usually

- A. Charged
- B. Uncharged
- C. Protein in nature
- D. Hydrophilic

43. Osmosis is the movement of water from

- A. Higher to lower osmotic potential
- B. Higher to lower water potential
- C. Higher to lower solute potential
- D. Hypertonic to hypotonic solution

44. In pinocytosis, the cell

- A. Takes in liquids
- B. Gets rid of waste
- C. Takes in solid food
- D. Secrete materials

45. The sodium potassium pump is an example on

- A. Pinocytosis
- B. Phagocytosis
- C. Exocytosis
- D. Active transport

46. Maintaining a high concentration of iodine in the thyroid gland is an example on

- A. Osmosis
- B. Diffusion
- C. Active transport
- D. Phagocytosis

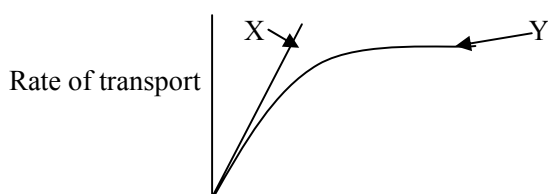
47. A paramecium feeds on a didinium by forming a vesicle around it, this is a form of

- A. Active transport
- B. Endocytosis
- C. Exocytosis
- D. Diffusion

48. If a plant cell is placed in a hypotonic solution it

- A. Loses water and becomes turgid
- B. Loses water and shrinks
- C. Gains water and becomes turgid
- D. Becomes plasmolysed

49. Study the following graph then answer the question below



Concentration of molecules

- A. X represents active transport, while Y represents simple diffusion
- B. X represents osmosis, while Y represents phagocytosis
- C. X represents simple diffusion, while Y represents active transport
- D. X represents pinocytosis, while Y represents phagocytosis

50. The contractile vacuole in paramecium is a structure that expels extra water. The paramecium needs this structure because it lives in

- A. Fresh water
- B. Salty water
- C. Dry environment
- D. Low food environment

51. One of the factors affecting the rate of simple diffusion is

- A. Size of molecules
- B. Number of protein gates
- C. ATP
- D. Number of Pinocytes

52. Energy is needed for

- A. Osmosis
- B. Simple diffusion
- C. Facilitated diffusion
- D. Phagocytosis

53. Pinocytosis takes place through

- A. Protein gates
- B. Protein channels
- C. Phospholipid bilayer
- D. Vesicles

54. In vesicle mediated transport changes occur in the

- A. Cell membrane
- B. Ribosomes
- C. Centrioles
- D. Chloroplasts

55. In osmosis water enters mostly through

- A. Pinocytes
- B. Phagocytes
- C. Phospholipid bilayer
- D. Protein channels

56. In osmosis water moves from

- A. High solute concentration to low solute concentration
- B. Concentrated solution to dilute solution
- C. Hypotonic solution to hypertonic solution
- D. Isotonic solution to hypotonic solution

57. Root hair cells take up water by

- A. Pinocytosis
- B. Phagocytosis
- C. Endocytosis
- D. Osmosis

58. Minerals and salts enter a root hair cell mainly by

- A. Osmosis
- B. Diffusion
- C. Active transport
- D. Pinocytosis

59. Red blood cells burst if placed in

- A. Isotonic solution
- B. Hypotonic solution
- C. Hypertonic solution
- D. Concentrated solution

60. Gaseous exchange occurs by

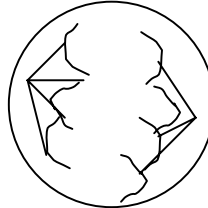
- A. Osmosis
- B. Diffusion
- C. Active transport
- D. Pinocytosis

Chapter 6

Mitosis

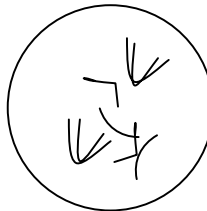
1. Which stage of mitosis is shown by the following diagram

- A. Prophase
- B. Anaphase
- C. Metaphase
- D. Interphase



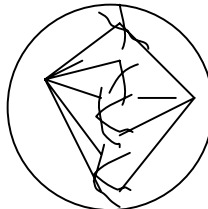
2. Which stage of mitosis is shown by the following diagram

- A. Prophase
- B. Anaphase
- C. Metaphase
- D. Interphase



3. Which stage of mitosis is shown by the following diagram

- A. Prophase
- B. Anaphase
- C. Metaphase
- D. Interphase



4. DNA replication occurs during

- A. Prophase
- B. Anaphase
- C. Metaphase
- D. Interphase

5. In preparation for mitosis

- A. The chromosomes split into two chromosomes
- B. The chromosomes split into two chromatids
- C. The chromosomes double into two chromatids
- D. The endoplasmic reticulum make new chromosomes

- 6. The two parts connected at the centromere are called**
- A. Chromosomes
 - B. Centrioles
 - C. Chromatids
 - D. Spindles
- 7. In a diploid cell the chromosomes are present in**
- A. Homologous pairs
 - B. Heterozygous pairs
 - C. In single forms
 - D. In triplets
- 8. In a diploid cell in a normal human**
- A. Each cell has either chromosomes contributed by the father or by the mother
 - B. The cell contains half the chromosomes from the father and half from the mother
 - C. The chromosomes are contributed by both parents in a ratio that depends on which characters are dominant
 - D. Each cell contains 2 chromosomes
- 9. Every somatic cell in the human body contains**
- A. 23 chromosomes
 - B. 46 chromosomes
 - C. 2 pairs of chromosomes
 - D. One pair from each parent
- 10. A homologous pair of chromosomes is made of**
- A. 23 chromosomes
 - B. 46 identical chromosomes
 - C. 2 chromosomes
 - D. 2 chromatids
- 11. In a normal human, the X chromosome is present in**
- A. The sex cells only
 - B. The egg only
 - C. The sperm only
 - D. Every cell in the body

12. The X chromosome is present

- A. In females only
- B. In males and females
- C. In males only
- D. In the egg only

13. The first diploid cell in human development is the

- A. Egg
- B. Sperm
- C. Zygote
- D. Embryo

14. A cell in the liver of a male contains the following sex chromosomes

- A. XX
- B. XY
- C. Y
- D. Non of the above

15. Sex chromosomes are present

- A. Only in the testis and ovaries
- B. Only in the egg or the sperm
- C. Only in the gametes
- D. In muscle cells

16. Mitosis occurs

- A. In eggs and sperms
- B. In somatic cells
- C. Only in bone marrow
- D. Only in the zygote

17. Meiosis occurs in the

- A. Egg
- B. Sperm
- C. Zygote
- D. Testis

18. The sperm divides by

- A. Mitosis

- B. Meiosis
- C. Simple division
- D. Non of the above

19. The sperm fuses with the egg to produce the

- A. Gamete
- B. Embryo
- C. Zygote
- D. Haploid cell

20. In humans a normal gamete is

- A. Haploid
- B. Diploid
- C. Triploid
- D. Polyploid

21. Every body cell in humans (somatic cell) is

- A. Haploid
- B. Diploid
- C. The body has a mixture of diploid and haploid cells
- D. The testis and the ovaries are made of haploid cells, while the rest of the body is diploid

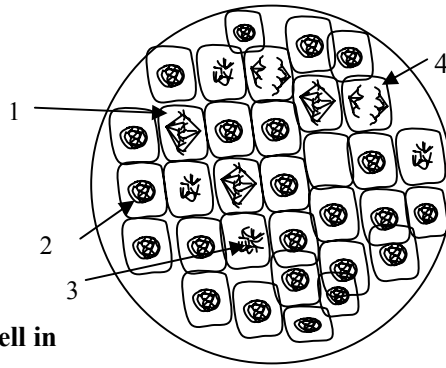
22. For growth in humans,

- A. A diploid cell divides into two haploid cells
- B. A diploid cell divides into two diploid cells
- C. A haploid cell divides into two diploid cells
- D. A haploid cell divides into two haploid cells

23. Centrioles are present in

- A. Red blood cells
- B. Wheat cells
- C. Liver cells
- D. Onion root tips

The following shows cells from onion root tip under the light microscope undergoing mitosis. Study the diagram, then answer questions 24 - 28



24. Arrow 1 is pointing at a cell in

- A. Interphase
- B. Prophase
- C. Metaphase
- D. Anaphase

25. Arrow 2 is pointing at

- A. Interphase
- B. Prophase
- C. Metaphase
- D. Anaphase

26. Arrow 3 is pointing at

- A. Interphase
- B. Prophase
- C. Metaphase
- D. Anaphase

27. Arrow 4 is pointing at

- A. Interphase
- B. Prophase
- C. Metaphase
- D. Anaphase

28. In the above cell, if the cell cycle takes 9 hours in onion root tips, then the length of time spent in interphase can be calculated as

- A. 2.3 hours
- B. 2.3 minutes
- C. 6.2 hours
- D. 5.1 hours

- 29. Mitosis results in**
- A. 2 cells with different genes
 - B. 2 genetically identical cells
 - C. 4 genetically identical cells
 - D. 4 genetically different cells
- 30. During mitosis**
- A. Crossing over takes place
 - B. Pairing up of homologous chromosomes takes place
 - C. Sister chromatids separate
 - D. Four genetically different cells are produced
- 31. Centrioles are present in**
- A. Animal cells
 - B. Plant and animal cells
 - C. Plant cells
 - D. Prokaryotes
- 32. The type of division occurring in root tips of plants is**
- A. Mitosis
 - B. Meiosis
 - C. Mitosis and meiosis
 - D. None of the above
- 33. Centrioles replicate during**
- A. Interphase
 - B. Prophase
 - C. Anaphase
 - D. Telophase
- 34. In metaphase of mitosis the chromosomes line up at the equator in**
- A. Homologous pairs
 - B. Non homologous pairs
 - C. In single file
 - D. In single chromatids

Onion root tips were observed under the light microscope. The following table shows the number of cells in each stage of mitosis. Carry out appropriate

calculations to fill in the spaces in the table below. The time taken for a whole cell cycle is 8 hours. Use this information to answer questions 35 - 41.

Stage	Number of cells observed	% number of cells	% time spent in each stage	Time spent in each stage
Interphase	360			
Prophase	30			
Metaphase	25			
Anaphase	12			
Telophase	18			
Total number of cells				

35. Which stage is the longest

- A. Interphase
- B. Prophase
- C. Metaphase
- D. Anaphase

36. Which stage is the shortest

- A. Interphase
- B. Prophase
- C. Metaphase
- D. Anaphase

37. The percentage of cells in anaphase is about

- A. 3
- B. 4
- C. 5
- D. 6

38. The length of time spent in anaphase is about

- A. 13 minutes
- B. 1 hour
- C. 1.3 hours
- D. 3.2 hours

39. The length of time spent in prophase is about

- A. 32 minutes
- B. 1.4 hours

- C. 2 hours
- D. 2.5 hours

40. The percentage of cells in metaphase is

- A. 5.6
- B. 6.8
- C. 9.4
- D. 10.3

41. The time (hours) spent in interphase is

- A. 2.3
- B. 3.8
- C. 6.4
- D. 7.2

42. DNA replication during interphase results in

- A. A chromosome splitting into two chromosomes
- B. A chromosome dividing into two chromatids
- C. A chromosome doubling into two chromatids
- D. Two chromatids joining to form one chromosome

43. DNA replication occurs during

- A. Interphase
- B. Prophase
- C. Anaphase
- D. Telophase

44. In an adult, DNA replication occurs mostly in

- A. Nerve cells
- B. Muscle cells
- C. Bone marrow cells
- D. Cardiac cells

45. DNA replication occurs in a cell

- A. All the time
- B. In preparation for division
- C. When proteins are needed

D. Only in the embryo

46. A chromosome becomes two chromatids by the end of

- A. Interphase
- B. Prophase
- C. Anaphase
- D. Telophase

47. The nuclear envelop disappears during

- A. Interphase
- B. Prophase
- C. Anaphase
- D. Telophase

48. In mitosis, the centromere splits during

- A. Interphase
- B. Prophase
- C. Anaphase
- D. Telophase

49. During cytokinesis in plant cells

- A. A cleavage furrow is formed
- B. A cell plate is formed
- C. Constriction between the two nuclei occurs
- D. The centrioles pull the two nuclei apart

50. During telophase

- A. The centromere splits
 - B. The chromosomes become thin and invisible
 - C. The sister chromatids separate
 - D. The spindle fibers appear
-

Chapter 7

Cell Respiration

1. Phosphorylation, oxidation and lysis are carried out on glucose in the process of

- A. Krebs cycle
- B. Glycolysis
- C. Link stage
- D. Chemiosmotic oxidative phosphorylation

2. Glycolysis produces the following products

- A. 2 pyruvate + 2ATP + 2NADH+H⁺
- B. 2 pyruvate + 6ATP + 2NADH+H⁺
- C. 4 pyruvate + 2ATP + 6NADH+H⁺
- D. 2 pyruvate + 1 ATP + NADH+H⁺

3. The formation of lactic acid can occur in

- A. Flowering Plants
- B. Non flowering plants
- C. Algae
- D. Mammals

4. The formation of alcohol can occur in

- A. Bacteria
- B. Worms
- C. Mammals
- D. Invertebrates

5. Anaerobic respiration produces the following number of ATP molecules

- A. 1
- B. 2
- C. 3
- D. 4

6. The major contributor of energy in aerobic respiration is:

- A. NADH
- B. FADH

- C. CoA
- D. FMN

7. Fatigue is due to the accumulation in the muscles of

- A. Ethanol
- B. Lactic acid
- C. Pyruvic acid
- D. Glucose

8. In the chemiosmotic oxidative phosphorylation in the mitochondria, the protons are pumped from:

- A. The intermembranal space to the matrix
- B. The matrix to the intermembranal space
- C. The matrix to the cytoplasm
- D. The cytoplasm to the matrix

9. The glycolysis stage of respiration occurs in the

- A. Mitochondria
- B. Golgi complex
- C. Endoplasmic reticulum
- D. Cytoplasm

10. The final acceptor of electrons in the electron transport chain is:

- A. NAD
- B. Carbon dioxide
- C. Water
- D. Oxygen

Study the following diagram, then answer questions 11-15

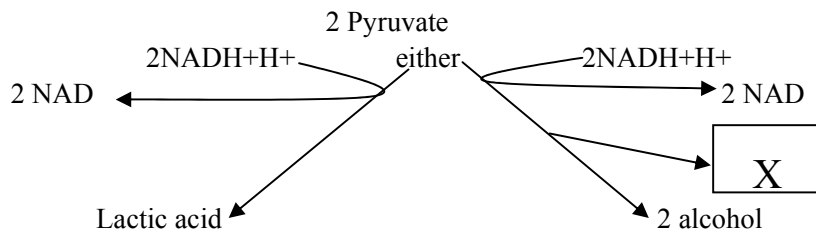


Diagram showing the stages of anaerobic respiration, which can lead either to alcohol or lactic acid formation

11. X in the box represents

- A. Water
- B. Oxygen
- C. Carbon dioxide
- D. Hydrogen

12. Lactic acid has the following number of carbon atoms

- A. 2
- B. 3
- C. 4
- D. 5

13. The NAD produced above can then be used in

- A. Krebs cycle
- B. Electron transport chain
- C. Link stage
- D. Glycolysis

14. In the above reactions NADH is

- A. Reduced
- B. Oxidised
- C. Hydrolysed
- D. Hydrogenated

15. In the above reactions pyruvate is

- A. Reduced
- B. Oxidised
- C. Hydrolysed
- D. Hydrogenated

16. The Krebs cycle occurs in the

- A. Cytoplasm
- B. Inner membrane of the mitochondria
- C. Outer membrane of the mitochondria
- D. Matrix of the mitochondria

17. The number of ATP molecules released directly by the Krebs cycle per molecule of glucose is

- A. 1
- B. 2
- C. 3
- D. 4

18. The number of NADH molecules released from the Krebs cycle per one glucose molecules is

- A. 2
- B. 4
- C. 6
- D. 8

19. Which of the following is correct concerning the reactions involving the conversion of pyruvate to lactic acid

- A. NAD is produced
- B. NADH is produced
- C. CO₂ is produced
- D. CO₂ is used

20. Which compound is not present in the matrix of the mitochondria

- A. NAD
- B. NADH
- C. FAD
- D. Starch

21. The electron transport chain passes the electrons from

- A. Higher to lower energy levels
- B. Lower to higher energy levels
- C. The matrix to the intermembranal space
- D. The intermembranal space to the matrix

22. The number of FADH molecules released by the Krebs cycle per molecule of glucose is

- A. 2
- B. 4
- C. 6
- D. 8

23. FAD is

- A. A Hydrogen carrier
- B. An enzyme
- C. A hormone
- D. A proton carrier

24. FADH gives its electrons to

- A. Water
- B. Hydrogen
- C. Chlorophyll
- D. Cytochrome

25. In the last stage of the electron transport chain, water is formed. In this reaction, Oxygen is

- A. Oxidized
- B. Reduced
- C. Hydrolyzed
- D. Released

26. In the electron transport chain in the mitochondria, the protons move passively from

- A. The matrix to the cristae
- B. The cristae to the matrix
- C. The intermembranal space to the matrix
- D. The matrix to the intermembranal space

27. In the mitochondria, during chemiosmotic oxidative phosphorylation, the protons move into the matrix

- A. With the gradient
- B. Against the gradient

- C. Against gravity
- D. Through the phospholipid bilayer

28. In the mitochondria, during chemiosmotic oxidative phosphorylation, the protons move into the matrix through

- A. ATP
- B. ATP synthetase
- C. Cytochrome
- D. Ribosomes

29. As the electrons go down the electron transport chain, they

- A. Gain energy
- B. Gain hydrogen
- C. Release energy
- D. Release hydrogen

The following table shows the number of certain compounds released from the different stages of respiration

Process	X	Y	Z
Glycolysis	2	2	0
Link reaction (oxidation of pyruvic acid into acetyl CoA)	0	2	0
Krebs cycle	2	6	2

30. X, Y, and Z are respectively

- A. NADH, FADH, ATP
- B. ATP, NADH, FADH,
- C. NADH, ATP, FADH
- D. FADH, NAD, ATP

31. In acetyl CoA, the acetyl group has the following number of carbons

- A. 1
- B. 2
- C. 3
- D. 4

32. After acetyl CoA is formed,

- A. CoA enters the Krebs cycle and the acetyl group comes out unaffected
- B. The acetyl group enters the Krebs cycle and CoA comes out unaffected

- C. The acetyl group breaks into acetyl and citric acid
- D. The acetyl group releases acetone

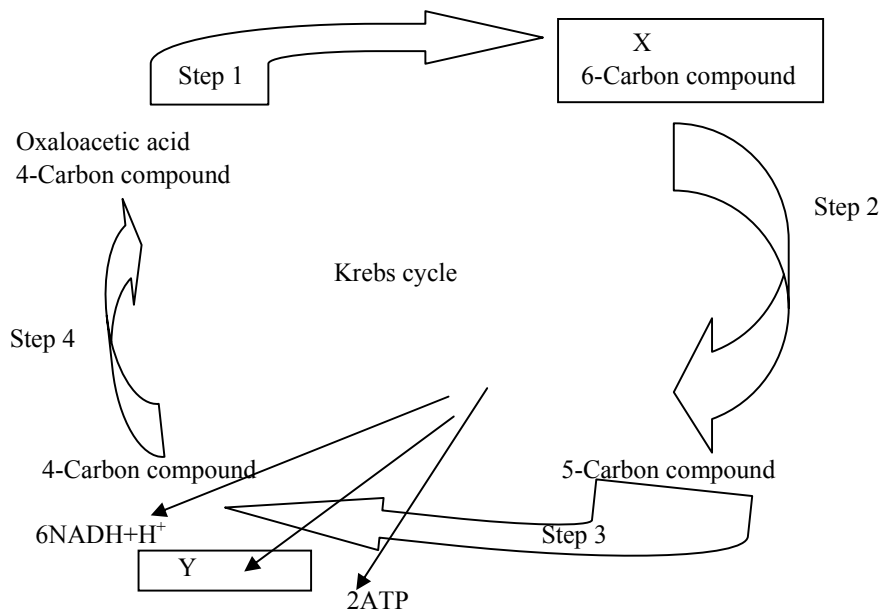
33. In the link stage, pyruvate is

- A. Oxidised into an acetyl group
- B. Reduced into an acetyl group
- C. Oxidised into lactic acid
- D. Oxidised into alcohol

34. In the conversion of pyruvate to acetyl CoA the following number of NADH is formed

- A. 0
- B. 1
- C. 2
- D. 3

Study the following diagram, then answer questions 35 - 36



35. Step 2 involves

- A. Decarboxylation
- B. Hydrolysis
- C. Condensation
- D. Dehydration

36. The 6-carbon compound in box X is

- A. Pyruvate
- B. Alcohol
- C. Citric acid
- D. Lactic acid

37. In this cycle, energy is produced in the form of ATP, NADH and another compound represented by box Y, what is Y

- A. ADP
- B. NAD
- C. FADH_2
- D. ETC

38. NADH is produced in

- A. Prokaryotes and eukaryotes
- B. Prokaryotes only
- C. Eukaryotes only
- D. Aerobic respiration only

39. NADH is produced in the

- A. Mitochondria only
- B. Cytoplasm and mitochondria
- C. Golgi Apparatus
- D. Lysosomes

40. Cytochromes are electron carriers in the electron transport chain of the mitochondria, they are

- A. Nucleotides
- B. Carbohydrates
- C. Lipids
- D. Proteins containing a heme group

41. Respiration is

- A. The process of inhale and exhale
- B. Exchange of gases
- C. Getting oxygen into the body
- D. A chemical reaction inside the cells

42. In glycolysis

- A. Glucose is oxidised
- B. Glucose is reduced
- C. NAD is oxidised
- D. Pyruvate is reduced

43. In glycolysis, $\text{NADH} + \text{H}^+$ is formed by the dehydrogenation of

- A. Pyruvic acid
- B. Lactic acid
- C. Alcohol
- D. Glucose

44. The compound formed by glycolysis is

- A. Acetyl coenzyme A
- B. Pyruvate
- C. Alcohol
- D. Citric acid

45. Anaerobic respiration occurs in the

- A. Cytoplasm
- B. Mitochondria
- C. Matrix
- D. Stroma

46. In the formation of lactic acid from pyruvate, pyruvate is

- A. Reduced
- B. Oxidised
- C. Decarboxylated
- D. Dehydrogenated

47. In the formation of alcohol from pyruvate, the pyruvate is

- A. Carboxylated
- B. Decarboxylated
- C. Dehydrated
- D. Dehydrogenated

48. Alcohol can be made in industry by using

- A. Aerobic bacteria
- B. Anaerobic bacteria

- C. Anaerobic grapes
- D. Aerobic grapes

49. The starting molecule in the Krebs cycle is

- A. Oxaloacetic acid.
- B. Citric acid.
- C. Lactic acid
- D. Pyruvate

50. The electron transport chain is made of

- A. Chlorophyll
- B. Cytochromes
- C. Nucleotides
- D. Nucleic acids

51. In the chemiosmotic oxidative phosphorylation, the electrons release energy by

- A. Going up their energy gradient
- B. Going down their energy gradient
- C. Gaining energy from $\text{NADH} + \text{H}^+$
- D. Gaining energy from the protons

52. Oxygen is needed in aerobic respiration as the final acceptor of

- A. Protons
- B. Electrons
- C. $\text{NADH} + \text{H}^+$
- D. Water

53. The efficiency of anaerobic respiration compared to aerobic is about

- A. 5%
- B. 15%
- C. 20%
- D. 30%

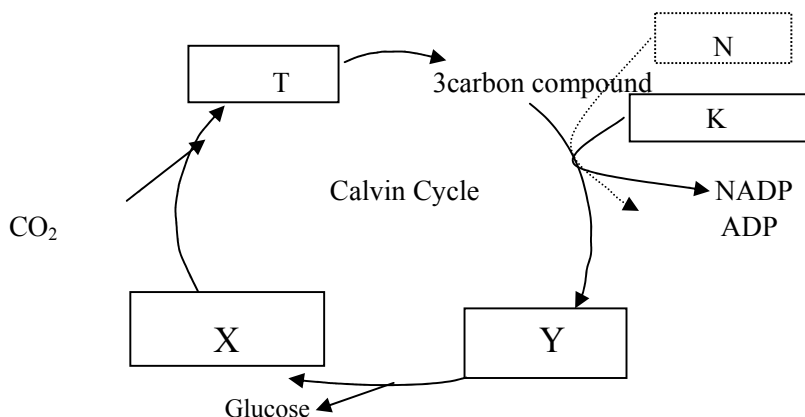
54. The net number of ATP produced by anaerobic respiration is

- A. 2
 - B. 4
 - C. 6
 - D. 8
-

Chapter 8

Photosynthesis

Study the following diagram which shows the Calvin cycle, then answer questions 1-3



1. How many carbon atoms are there in the compound represented by T

- A. 3
- B. 4
- C. 5
- D. 6

2. What is molecule X

- A. Oxaloacetate
- B. Citric acid
- C. Ribulose biphosphate
- D. Glucose

3. What is molecule Y

- A. PG
- B. GALP
- C. Ribulose biphosphate
- D. Glucose

4. What are molecules N and K respectively

- A. NAD, ATP
- B. NAD, ADP

- C. ATP, FAD
- D. ATP, NADPH

5. What kind of compounds are NADP and ATP

	NADP	ATP
A	Nucleic acids	Nucleotides
B	Nucleotides	Nucleic acids
C	Proteins	Proteins
D	Nucleotides	Nucleotides

6. The structure of one of the following compounds contains a vitamin

- A. ATP
- B. ADP
- C. FAD
- D. DNA

7. In the chemiosmotic photophosphorylation, protons are pumped from the

- A. Stroma to the thylakoid space
- B. Thylakoid space to the stroma
- C. Cytoplasm to the thylakoid space
- D. Thylakoid space to the cytoplasm

8. In the chloroplast, ATP synthetase has its head part directed towards the

- A. Thylakoid space
- B. Cytoplasm
- C. Intermembranal space
- D. Stroma

9. Photolysis of water occurs in the

- A. Thylakoid
- B. Stroma
- C. Ribosomes
- D. Matrix

10. When light strikes photosystem I

- A. Protons are released from chlorophyll
- B. Protons are released from the matrix
- C. Electrons are released from chlorophyll
- D. Electrons are released from the stroma

11. Electrons released from Photosystem II are then taken by

- A. Photosystem I
- B. Photosystem II
- C. NAD
- D. NADP

12. The light independent stage can happen

- A. Only in the light
- B. In the light and in the dark
- C. Only in the dark
- D. Non of the above

13. The electrons lost by Photosystem II are replaced by electrons from

- A. Oxygen
- B. NADPH
- C. NADH
- D. Water

14. When water splits in the chloroplasts, it produces

- A. Electrons, oxygen and a hydroxyl group
- B. Electrons, oxygen and protons
- C. A hydrogen and a hydroxyl group
- D. A hydrogen molecule and an oxygen atom

15. The products of the light dependent stage are

- A. ADP, NAD and oxygen
- B. ADP, NADH and oxygen
- C. ATP, NADPH and oxygen
- D. ATP, NADH and oxygen

16. The light independent stage involves reactions in the

- A. Krebs cycle
- B. Calvin cycle
- C. Photosystem I
- D. Photosystem II

17. The Calvin cycle starts with the reaction of

- A. Water with Ribulose biphosphate
- B. Water with PGA
- C. Carbon dioxide with ribulose biphosphate
- D. Carbon dioxide with PGA

18. In C4 plants, carbon dioxide needed for the carbon cycle is supplied

- A. Directly from the atmosphere
- B. By oxaloacetate
- C. From the light dependent reaction
- D. By breakdown of ribulose biphosphate.

19. The light dependent stage needs the following resources

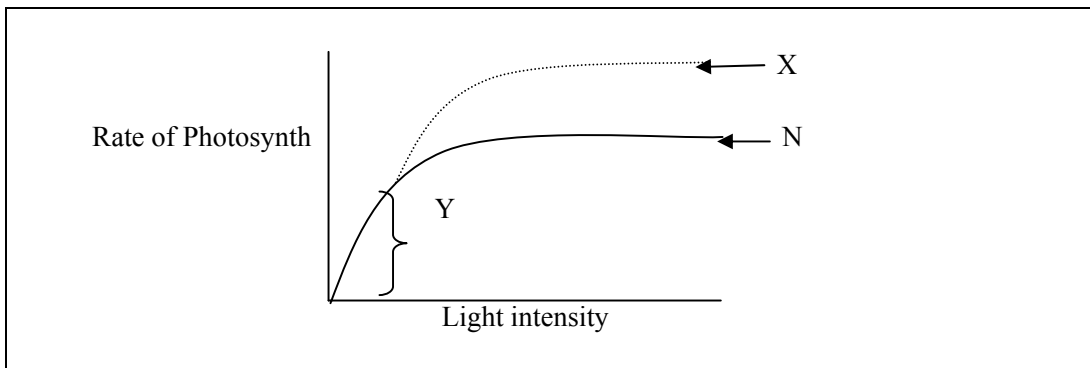
- A. Water, carbon dioxide and light
- B. Water and light
- C. ATP and light
- D. Chlorophyll and carbon dioxide

20. The oxygen released into the atmosphere from the process of photosynthesis comes

From

- A. Carbon dioxide
- B. Glucose
- C. Water
- D. Starch

Study the following graph which shows light as a limiting factor (keeping other factors constant) in the process of photosynthesis, then answer questions 21&22



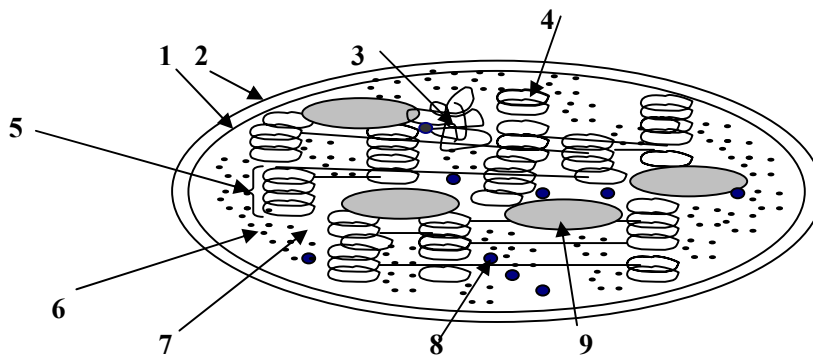
21. What would increase the rate of photosynthesis from N to X

- A. Increasing light intensity
- B. Increasing carbon dioxide concentration
- C. Increasing water
- D. Putting the plant in bright sunlight

22. The increase in photosynthesis in the Y segment of the graph is most probably due to increasing

- A. Temperature
- B. Light
- C. CO₂
- D. Water

Study the following diagram showing the structure of the chloroplast, then answer questions 23-28



23. Structures 3, 4 and 9 are respectively

- A. Thylakoid, DNA, starch grain
- B. Starch grain, DNA, thylakoid
- C. Starch grain, DNA, endoplasmic reticulum
- D. DNA, thylakoid, starch grain

24. The light dependent stage occurs in

- A. 5
- B. 7
- C. 8
- D. 9

25. The light independent stage occurs in

- A. 1
- B. 2
- C. 5
- D. 7

26. The function of structure 6 is to make

- A. Starch
- B. Sugar
- C. Oils
- D. Enzymes

27. The function of structure 9 is to store

- A. Chlorophyll
- B. Cytochromes
- C. Starch
- D. Glycogen

28. Photolysis occurs in structure

- A. 4
- B. 7
- C. 8
- D. 9

29. ATP is synthesised in

- A. The light dependent stage of photosynthesis
- B. The light independent stage of photosynthesis
- C. The Calvin cycle
- D. The carbon fixation stage

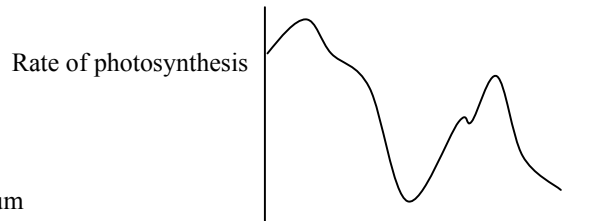
30. The resources needed for the Calvin cycle are

- A. Oxygen, Light and ATP
- B. Oxygen, light and NADPH
- C. Carbon dioxide, and light
- D. Carbon dioxide, NADPH and ATP

31. NADPH carries hydrogen to the carbon dioxide reduction stage, this hydrogen comes from

- A. Glucose
- B. Ribose
- C. Ribulose
- D. Water

32. The following graph illustrates the



- A. Absorption spectrum
- B. Action spectrum
- C. Effect of light intensity on photosynthesis
- D. Effect of Carbon dioxide on photosynthesis

33. To fix carbon dioxide into glucose in the light independent stage, the following atoms are needed

- A. Nitrogen
- B. Oxygen
- C. Hydrogen
- D. Carbon

34. Cyclic photophosphorylation occurs in the

- A. Cytoplasm
- B. Intermembranal space
- C. Stroma
- D. Grana

35. In cyclic photophosphorylation, only the following substances are formed

- A. ATP
- B. ATP and NADPH
- C. NADPH
- D. NADH

36. In cyclic photophosphorylation the following is used

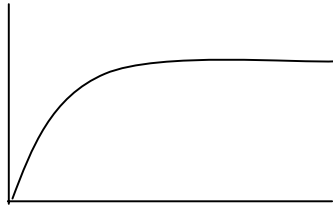
- A. Photosystem I and the electron transport chain of photosystem I

- B. Photosystem II and the electron transport chain of photosystem II
- C. Photosystem II and the electron transport chain of photosystem I
- D. Photosystem I and the electron transport chain of photosystem II

37. In cyclic photophosphorylation the electron that cycles is released from

- A. Photosystem I
- B. Photosystem II
- C. Photosystem I and II
- D. Water

38. The diagram below shows the effect of the following factor on the rate of photosynthesis



- A. Wavelength of light
- B. Temperature
- C. Light intensity
- D. Light duration

39. The hydrogen needed for reducing CO_2 comes from

- A. Photosystem I
- B. Photosystem II
- C. Water
- D. Chlorophyll

40. ATP synthetase is imbedded in the

- A. Outer membrane of the chloroplast
- B. Inner membrane of the chloroplast
- C. Starch grain membrane
- D. Thylakoid membrane

41. The thylakoids function in

- A. Calvin cycle
- B. Krebs cycle

- C. Glycolysis
- D. Photophosphorylation

42. Another name for GALP is

- A. Phosphoglycerate
- B. Glycerate phosphate
- C. Triose phosphate
- D. Glucose

43. In the Calvin cycle, the enzyme Rubp carboxylase catalyses the

- A. Addition of carbon dioxide to Rubp
- B. Removal of carbon dioxide from Rubp
- C. Addition of carbon dioxide to glucose
- D. Removal of carbon dioxide from glucose

44. Dehydrogenase changes

- A. ADP to ATP
- B. PGAL to glucose
- C. NADPH to NADP
- D. Rubp to PG

45. in the Calvin cycle, the carbon dioxide acceptor is

- A. Water
- B. Chlorophyll
- C. Ribulose biphosphate
- D. Glucose

46. the light dependent reaction of photosynthesis occurs in the

- A. Matrix
- B. Thylakoids
- C. Ribosomes
- D. Stroma

47. which of the following processes does not take place in the stroma of the chloroplasts

- A. ATP hydrolysis
- B. ATP synthesis

- C. Reduction of phosphoglycerate
- D. Formation of Triose phosphate

48. In the formation of GALP in the light independent reaction, phosphoglycerate is

- A. Oxidized
- B. Reduced
- C. Lysed
- D. carboxylated

49. which of the following compounds is not produced in the light dependent cycle

- A. Glucose
- B. Oxygen
- C. ATP
- D. $\text{NADPH} + \text{H}^+$

50. photolysis occurs in the

- A. Calvin cycle
 - B. Light dependent reaction
 - C. Light independent reaction
 - D. Stroma
-

Chapter 9

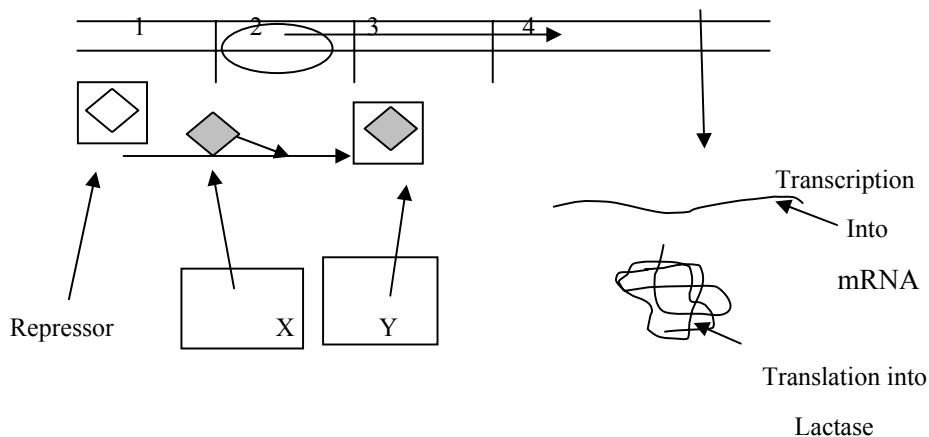
Molecular Genetics

- 1. An organism's genome is the complete sequence of**
 - A. Genes of all the chromosomes
 - B. Sugars in the nucleotides
 - C. Defective genes
 - D. Nucleotides of all the genes
- 2. Exons are the genes that**
 - A. Code for defective genes
 - B. Code for mutations
 - C. Code for protein synthesis
 - D. Do not code for proteins
- 3. If a protein is made of 150 amino acids, then the number of codons on the mRNA strand is**
 - A. 50
 - B. 150
 - C. 450
 - D. 600
- 4. If a protein is made of 100 amino acids, then the number of nucleotides on the mRNA is**
 - A. 100
 - B. 200
 - C. 300
 - D. 400
- 5. If the number of nucleotides on mRNA is 600, then the number of amino acids that it can code for is**
 - A. 100
 - B. 200
 - C. 300
 - D. 600

6. If the number of nucleotides on mRNA is 600, then the number of anticodons involved in transcription is

- A. 100
- B. 200
- C. 300
- D. 600

Study the following diagram, which shows the lac operon in bacteria, then answer questions 7-11



7. 1,2,3,and 4 represent respectively the following types of genes

- A. Promoter, regulator, operator, structural
- B. Structural, promoter, regulator, operator
- C. Operator, promoter, regulator, structural
- D. Regulator, promoter, operator, structural

8. X represents

- A. An inducer
- B. Promoter
- C. Regulator
- D. Operon

9. Y represents

- A. Active repressor
- B. Inactive repressor
- C. Promoter
- D. Regulator

10. The inducer in the lac operon shown above is

- A. The operator
- B. The operon
- C. The regulator
- D. Lactose

11. RNA polymerase is attached to the

- A. Regulator
- B. Operator
- C. Operon
- D. Promoter

12. A chromosome is made of DNA and

- A. Carbohydrates
- B. RNA
- C. Proteins
- D. Lipids

13. The 3' to 5' direction of a DNA strand refers to the position of

- A. Hydrogen in the ribose of each nucleotide
- B. Carbon in the deoxyribose of each nucleotide
- C. Nitrogen in the nitrogen base
- D. Phosphates in the whole chain

14. During DNA replication, the new nucleotides that start binding with the unpaired nucleotide arrive as

- A. Nucleoside diphosphate
- B. Nucleoside triphosphate
- C. Nucleoside 5 phosphate
- D. Nucleoside 6 phosphate

15. The energy needed for building the new chain is produced from breaking

- A. DNA nucleotide
- B. ATP
- C. 2 phosphates from a nucleoside triphosphate
- D. Hydrogen bonds

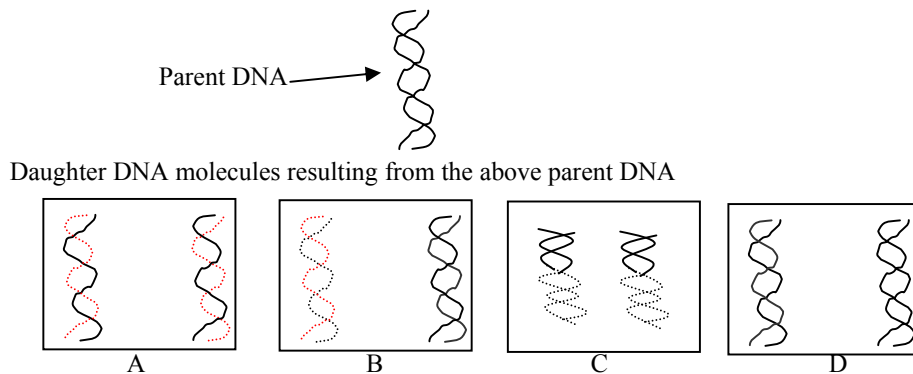
16. Topoisomerase is an enzyme involved in DNA replication, it functions in

- A. Breaking hydrogen bonds
- B. Relieving the super coiling of the two DNA chains
- C. Growing a new chain
- D. Preventing rejoining of the two DNA chains

17. DNA replication is needed for

- A. Mitosis only
- B. Meiosis only
- C. Mitosis and meiosis
- D. Either mitosis or meiosis depending on the type of cell

18. When DNA replicates the following outcome is produced



19. In DNA replication the new chain grows in a

- A. 3' to 5' direction
- B. 5' to 3' direction
- C. Any direction
- D. Depends on Okazaki fragments

20. The leading strand in DNA replication is the strand that

- A. Grows in fragments
- B. Grows continuously
- C. Dictates the sequence
- D. Causes mutation

21. After replication, the daughter DNA molecules

- A. Have all their nucleotides from the parent DNA
- B. One strand contains only parental nucleotides and the other is assembled newly
- C. Each strand contains a mixture of parental and newly assembled nucleotides.
- D. The two strands contain nucleotides randomly assembled.

22. In DNA replication the nucleotides are added to the following position of the growing strand

- A. The 3' position
- B. The 5' position
- C. Any position
- D. The 3' and 5' positions

23. During replication the first bit that starts the new strand is

- A. DNA primer
- B. RNA primer
- C. Polymerase
- D. Amino acids

24. The enzyme that breaks the hydrogen bonds between the two DNA strands is called

- A. RNA polymerase
- B. DNA polymerase
- C. Ligase
- D. Helicase

25. The Okazaki fragments are connected by

- A. RNA polymerase
- B. DNA polymerase
- C. Helicase
- D. Ligase

26. DNA replication precedes

- A. Mitosis only
- B. Meiosis only
- C. Mitosis and meiosis
- D. Depends on the number of chromosomes

27. DNA replication occurs in the

- A. Nucleus
- B. Cytoplasm
- C. Extracellular fluid
- D. On the ribosome surface

28. The two daughter DNA molecules resulting from replication are

- A. Identical to RNA
- B. Identical to the parent DNA
- C. Made of one strand each
- D. Made of uracil instead of thymine

29. Translation results in the formation of

- A. mRNA
- B. tRNA
- C. rRNA
- D. Polypeptide

30. The DNA triplet that results in an anticodon of UUU is

- A. AAA
- B. CCC
- C. GGG
- D. TTT

31. In genetic engineering the enzyme responsible for connecting the pieces of DNA together is

- A. Endonucleases
- B. Lipase
- C. Ligase
- D. Restriction enzymes

32. In gene control in prokaryotes the regulator gene codes for the synthesis of the

- A. Repressor
- B. Promoter
- C. Inducer
- D. Operator

33. In gene control in prokaryotes the operator can be blocked by the

- A. Inducer
- B. Repressor
- C. Promoter
- D. Operon

34. In gene control in prokaryotes, a protein will be synthesized if

- A. An active repressor is produced
- B. An inactive repressor is formed
- C. The operator is blocked
- D. The inducer is blocked

35. In the lac operon the inducer is

- A. Glucose
- B. Lactose
- C. Galactose
- D. Sucrose

36. In gel electrophoresis, a DNA mixture can be separated according to

- A. Color of DNA molecules
- B. Charge
- C. Protein association
- D. Amino acid association

37. Polymerase chain reaction can be used to produce

- A. Plasmids
- B. Substitution
- C. Deletion
- D. Monoclonal DNA

38. Sick cell anaemia is due to

- A. Deletion
- B. Inversion
- C. Substitution
- D. Addition

39. Transcription occurs in the

- A. Cytoplasm
- B. Cell membrane
- C. Ribosomes
- D. Nucleus

40. Transcription results in the formation of

- A. RNA
- B. RNA and DNA
- C. Ribosomes
- D. Amino acids

41. In transcription the RNA strand grows in a

- A. 3' to 5' direction
- B. 5' to 3' direction
- C. Any direction
- D. Okazaki fragments

42. Translation starts from the

- A. 3' end of mRNA
- B. 5' end of mRNA
- C. 3' end of tRNA
- D. 5' end of tRNA

43. During translation the surface of one ribosome can be occupied by

- A. One codon
- B. Two codons
- C. Three codons
- D. 4 codons

44. The amino acid is added to the

- A. A site of the smaller ribosome subunit
- B. P site of the smaller ribosome subunit
- C. A site of the larger ribosome subunit
- D. P site of the larger ribosome subunit

45. The genetic code is described as degenerate because

- A. Each codon can code for more than one amino acid
- B. The same codon codes for the same amino acid in all organisms
- C. Some codons are nonsense codons
- D. One amino acid can have more than one codon

46. Nonsense codons code for

- A. Many amino acids
- B. The same amino acid
- C. Non specific amino acids
- D. No amino acids

47. Except for uracil instead of thymine, mRNA is

- A. The same sequence as the template DNA strand
- B. The same sequence as the inactive DNA strand
- C. Complementary sequence to the ribosomal RNA
- D. Complementary sequence to the inactive DNA strand

48. The active DNA strand runs in a

- A. 3' to 5' direction
- B. 5' to 3' direction
- C. Any direction
- D. Similar to its complementary chain

49. If a DNA molecule has 1000 nucleotides out of which 200 are thymine, what is the percentage of cytosine.

- A. 20
- B. 30
- C. 40
- D. 60

50. After DNA is synthesized on the ribosomes it is packaged in the

- A. Cristae and sent to the Golgi Complex
 - B. Stroma and modified by the Golgi complex
 - C. Vesicles and modified by the RER
 - D. Cisternae and sent to the Golgi complex
-

Chapter 10

Meiosis

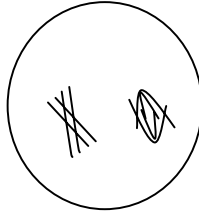
1. **DNA replication occurs during**
 - A. Interphase
 - B. Anaphase
 - C. Metaphase
 - D. Telophase
2. **Anaphase II is marked by the splitting of the**
 - A. Centriole
 - B. Centromere
 - C. Chromatid
 - D. Chromatin
3. **During anaphase II**
 - A. The distance between the sister chromatids increases
 - B. The distance between the sister chromatids decreases
 - C. The distance between the chromatids and the centriole increases
 - D. The distance between the alleles of a chromosome decreases
4. **Meiosis produces**
 - A. 2 cells with different genotypes
 - B. 4 cells with different genotypes
 - C. 2 cells with identical genotypes
 - D. 4 cells with identical genotypes
5. **The number of different gametes produced in meiosis**
 - A. Is always 4
 - B. Is always 16
 - C. Depends on the number of chromosomes
 - D. Depends on the number of gametes
6. **Down's syndrome is a consequence of:**
 - A. Gene mutation
 - B. Gene substitution
 - C. Gene addition
 - D. Non disjunction

- 7. In Down's syndrome the number of chromosomes in a diploid cell is**
- A. 45
 - B. 46
 - C. 47
 - D. 48
- 8. Trisomy in a cell means a cell with**
- A. Triploid number of chromosomes
 - B. A haploid number of chromosomes
 - C. Three copies of a chromosome
 - D. 3 chromosomes
- 9. During anaphase I of meiosis**
- A. The sister chromatids separate
 - B. The homologous chromosomes separate
 - C. The alleles of one gene separate
 - D. The nuclear envelop disappears
- 10. Crossing over results in**
- A. Mutation
 - B. Down's syndrome
 - C. Variation
 - D. Sickle cell anaemia
- 11. Sickle cell anaemia is a consequence of**
- A. Non-disjunction
 - B. Addition
 - C. Deletion
 - D. Substitution
- 12. Pairs of chromosomes are arranged in the equator of the cell, is a description of**
- A. Metaphase of mitosis
 - B. Metaphase I of meiosis
 - C. Metaphase II of meiosis
 - D. Anaphase of mitosis
- 13. Crossing over occurs during**
- A. Prophase of mitosis

- B. Prophase I of meiosis
- C. Prophase II of meiosis
- D. Metaphase of meiosis

14. In an individual with a diploid number of 4, the following diagram describes:

- A. Prophase of mitosis
- B. Prophase I of meiosis
- C. Prophase II of meiosis
- D. Metaphase of mitosis



15. A cell with 5 pairs of chromosomes can produce the following number of different gametes

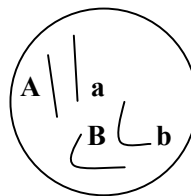
- A. 4
- B. 8
- C. 16
- D. 32

16. Meiosis results in the formation of

- A. Zygotes
- B. Embryos
- C. Gametes
- D. Somatic cells

17. The only gametes that can be formed from the cell shown below are

- A. Aa, Bb
- B. AB, ab
- C. Aa, Ab, AB, aB
- D. AB, Ab, aB, ab



18. One of the gametes produced from a cell with AaBbCc genotype is

- A. ABb
- B. Abc
- C. AaC
- D. Aab

19. A cell with AaBbDd genotype can produce the following gametes ABD, abd, ABd, abD, AbD, aBd. What are the other two gametes that it can produce?

- A. ABd, aBD
- B. aBD, Abd
- C. AaD, aaB
- D. ABD, Abd

20. What is the number of different gametes that can be produced by a cell with 4 pairs of chromosomes?

- A. 8
- B. 16
- C. 24
- D. 32

21. The number of different gametes that can be produced because of independent assortment can be calculated using the following formula

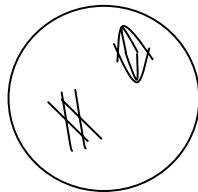
- A. n^{2n}
- B. n^2
- C. 2^n
- D. 3^n

22. In the above question n represents the

- A. The haploid number of chromosomes
- B. The diploid number of chromosomes
- C. The number of gametes
- D. The number of cells

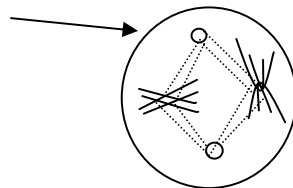
23. The following diagram represents

- A. Prophase I
- B. Metaphase I
- C. Prophase II
- D. Metaphase II



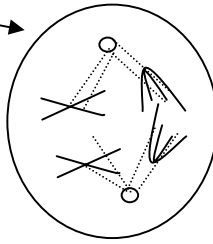
24. This diagram represents

- A. Metaphase I
- B. Metaphase II
- C. Anaphase I
- D. Anaphase II



25. This diagram represents

- A. Metaphase I
- B. Metaphase II
- C. Anaphase I
- E. Anaphase II



26. The number of chromatids in humans in prophase I of meiosis is

- A. 23
- B. 46
- C. 92
- D. 184

27. The number of chromatids in humans in anaphase I of meiosis is

- A. 23
- B. 46
- C. 92
- D. 184

28. The number of chromatids in humans in metaphase II of meiosis is

- A. 23
- B. 46
- C. 92
- D. 184

29. If the amount of DNA in a diploid cell is 7 pg, then the amount of DNA in prophase I of meiosis (pg = Pico gram) is

- A. 7
- B. 14
- C. 21
- D. 28

30. If the amount of DNA in a diploid cell is 7 pg, the amount of DNA in prophase II of meiosis is

- A. 3.5
- B. 7
- C. 14

D. 21

31. If the amount of DNA in a diploid cell is 7 pg, the amount of DNA in a sperm is

- A. 3.5
- B. 7
- C. 14
- D. 21

If a cell has a DNA mass of 9 pg at prophase I of meiosis, answer questions 32-46 by choosing the correct amount of DNA in the stage indicated by each question:

32. Prophase II of meiosis

- A. 2.25
- B. 4.5
- C. 9
- D. 18

33. Prophase of mitosis

- A. 2.25
- B. 4.5
- C. 9
- D. 18

34. In metaphase I of meiosis

- A. 2.25
- B. 4.5
- C. 9
- D. 18

35. In metaphase II of meiosis

- A. 2.25
- B. 4.5
- C. 9
- D. 18

36. In telophase II of meiosis

- A. 2.25
- B. 4.5
- C. 9
- D. 18**

37. Meiosis occurs in the

- A. Bone marrow
- B. Skin**
- C. Testis
- D. Sperms

38. Meiosis involves

- A. One cell division
- B. Two cell divisions
- C. Three cell divisions
- D. Four cell division

39. The total number of chromosomes in the 4 cells resulting from meiosis is equal to

- A. Half the number of chromosomes of the starting cell
- B. Double the number of chromosomes of the starting cell
- C. Same as the number of chromosomes of the starting cell
- D. 4 times the number of chromosomes of the starting cell**

40. Pairing up of homologous chromosomes occurs in

- A. Prophase of mitosis
 - B. Prophase I of meiosis
 - C. Prophase II of meiosis
 - D. Metaphase of mitosis**
-

Chapter 11

Transmission of Characters

- 1. A nucleosome is part of a**
 - A. Ribosome
 - B. Lysosome
 - C. Chromosome
 - D. Mesosome

- 2. A nucleosome is made of**
 - A. 8 histone molecules plus a wrapping DNA
 - B. 8 DNA molecules plus a wrapping histone chain
 - C. 6 histone molecules plus a wrapping DNA
 - D. 6 DNA molecules plus a wrapping histone chain

- 3. A pair of homologous chromosomes has the same**
 - A. Set of alleles
 - B. RNA
 - C. Nitrogen bases
 - D. Pattern of banding

- 4. Blood groups is a character that is controlled by**
 - A. One gene with 2 alleles
 - B. 2 genes
 - C. 3 genes
 - D. One gene with 3 alleles

- 5. Free earlobes in humans is a dominant phenotype controlled by one gene. A couple has free earlobes and they produce a child with attached earlobes. What is the chance that their next child is a girl with free earlobes.**
 - A. $\frac{1}{4}$
 - B. $\frac{1}{8}$
 - C. $\frac{3}{8}$
 - D. $\frac{6}{8}$

6. If a garden pea plant with purple flowers is test crossed, and the offsprings showed a 1:1 ratio of purple to white, then this tested plant must be;
- A. Homozygous
 - B. Heterozygous
 - C. Homologous
 - D. Hon-homologous
7. The parents of a child with an O blood group can be one of the following
- A. AB X AB
 - B. AB X A
 - C. AB X O
 - D. A X B
8. The probability that a family of four children will consist of 2 boys and 2 girls is
- A. 1/2
 - B. 1/4
 - C. 1/8
 - D. 1/16
9. A plant with red flowers is crossed with one with white flowers. The offsprings resulting from the cross show a 1:1 ratio. Using R as the symbol for the gene of flower color, we can say that the genotypes of the parents are:
- A. RR X rr
 - B. Rr X Rr
 - C. Rr X rr
 - D. Rr X RR
10. In genetic engineering a person with diabetes can be treated by injection with
- A. A plasmid
 - B. Bacterium
 - C. Insulin
 - D. Restriction enzyme

11. A parent with the genotype AaBb can produce the following gamete

- A. Aa
- B. AB
- C. Bb
- D. BB

When pea plants with green pods and purple flowers were self crossed the following resulted. (Answer questions 12-16)

Purple flowers green pods	1205
Purple flowers yellow pods	400
White flowers green pods	405
White flowers yellow pods	130

12. These results demonstrate

- A. Autosomal linkage
- B. Sex linkage
- C. Independent assortment
- D. Continuous variation

13. What is the expected ratio if these results follow the law of independent assortment

- A. 1 : 1 : 1 : 1
- B. 1 : 3 : 1 : 3
- C. 1 : 3 : 3 : 1
- D. 9 : 3 : 3 : 1

14. What should be the expected number of these plants if they follow the law of independent assortment

Phenotypes	Observed	Expected			
		A	B	C	D
Purple flowers green pods	1205	1203	900	1800	535
Purple flowers yellow pods	400	401	300	600	535
White flowers green pods	405	401	300	600	535
White flowers yellow pods	130	134	100	200	535

15. Using the following formula, $\chi^2 = \sum \frac{(O - E)^2}{E}$

the Chi square value (based on the correct answer for question 14) would be

- A. 0.16
- B. 0.61
- C. 3.8
- D. 6.3

16. The degrees of freedom for this study is

- A. 2
- B. 3
- C. 4
- D. 5

17. A fly heterozygous for long wings and red eyes is crossed with a fly with the recessive characters of vestigial wings (reduced wings) and purple eyes. The results of the cross were as the following

Long wings red eyes	309
Long wings purple eyes	11
Vestigial wings red eyes	14
Vestigial wings purple eyes	306

These results can be due to:

- A. Autosomal linkage
- B. Sex linkage
- C. Independent assortment
- D. Continuous variation

18. In question 17 the distance between the two genes involved in the study can be calculated as:

- A. 3.9
- B. 4.1
- C. 40.1
- D. 25

19. The alleles responsible for the above characters are shown below

Long wings W , vestigial wings w, red eyes R, purple eyes r

The parents must have the following genotypes:

- A. TtRR X Ttrr
- B. TtRR X Ttrr

- C. $TtRr \times TtRr$
- D. $TtRr \times ttrr$

An albino rat was crossed with a black one, resulting in the production of 14 black rats.

When the albino was crossed with another black rat, the offsprings were 8 black and 9 albino. (answer questions 20&21)

20. From these results we can conclude that

- A. Albino is dominant
- B. Albino is recessive
- C. This character is sex linked
- D. This character shows incomplete dominance

21. The second black rat is

- A. A male
- B. A female
- C. Homozygous
- D. Heterozygous

22. Phenylketonuria is a genetic disease caused by a recessive allele. Two parents who appear normal had a child with the disease. What is the genotype of the parents

(P = normal, p = affected).

- A. $PP \times pp$
- B. $Pp \times pp$
- C. $Pp \times PP$
- D. $Pp \times Pp$

23. In the above question, what is the chance that this family would have another child with phenylketonuria

- A. $1/2$
- B. $1/3$
- C. $3/4$

D. 1/4

In garden peas, green seeds (G) are dominant over yellow (g), and rounded seeds (R) are dominant over wrinkled (r). The two genes are present on two different chromosomes. Answer questions 24 - 27

24. What is the genotype of a parent heterozygous for both characters.

- A. GGRR
- B. GrRr
- C. GgRr
- D. GGRr

25. Which one of the following offspring numbers can be produced by a cross between two heterozygous parents.

	Green rounded	Green wrinkled	yellow rounded	yellow wrinkled
A	920	302	299	105
B	820	790	802	504
C	812	798	790	804
D	905	907	302	310

26. Two plants were crossed and produced 4 different phenotypes in a 1 : 1: 1 :1 ratio, these parents must be

- A. Both homozygous dominant for both characters
- B. Both homozygous recessive for both characters
- C. Both heterozygous for both characters
- D. One heterozygous for both characters and the other recessive for both characters

27. What is the ratio of offsprings resulting from a cross between two parents having the genotypes GgRr X GGRr

- A. 3 : 1
- B. 1 : 1
- C. 9: 3 : 3 : 1
- D. 1 : 1: 1 :1

28. Two snapdragon plants were crossed, one having red flowers and the other white. The resulting first generation was all pink. This can be explained by
- Sex linkage
 - Mutation
 - Complete dominance
 - Incomplete dominance
29. Albinism is controlled by a single gene, and it is caused by a recessive allele. Two normal parents produce an albino child. What is the genotype of these parents?
- AA X Aa
 - Aa X Aa
 - aa X Aa
 - AA X aa
30. What is the chance that the family above will produce an albino girl
- 1/2
 - 1/4
 - 1/6
 - 1/8

Color blindness is caused by a sex-linked recessive allele. A color blind man marries a normal woman whose father is color blind. Based on this information, answer Q 31- 33

31. What are the genotypes of the man and his wife respectively
- $X^C Y$ $X^c Y$
 - $X^C Y$ $X^C X^C$
 - $X^C Y$ $X^c X^c$
 - $X^c Y$ $X^C X^c$
32. The woman's father has a genotype of
- $X^C Y$
 - $X^c Y$

- C. $X^C X^c$
- D. $X^c X^c$

33. The probability that the man and his wife would produce a color blind daughter is

- A. 1/2
- B. 1/3
- C. 1/4
- D. 1/8

In *Drosophila*, eye color and wing size are located on the same chromosome. A cross between two pure line varieties, one with red eyes, normal wings and the other with cinnabar eyes, vestigial wings was carried out. The first generation of this cross was all with red eyes and normal wings. When flies from the first generation were crossed, the second generation showed the following numbers

Red eyes, normal wings	1220
Red eyes, vestigial wings	93
Cinnabar eyes, normal wings	104
Cinnabar eyes, vestigial wings	405

Based on the above information, answer questions 34 – 41

34. Which phenotypes are dominant

- A. Cinnabar eyes, normal wings
- B. Cinnabar eyes, vestigial wings
- C. Red eyes, normal wings
- D. Red eyes, vestigial wings

35. What is the genotype of the original parents?

- A. Homozygous dominant for both characters X homozygous dominant for both characters
- B. Homozygous dominant for both characters X heterozygous for both characters
- C. Homozygous dominant for both characters X homozygous recessive for both characters
- D. Heterozygous dominant for both characters X heterozygous dominant for both characters

36. What is the ratio of offsprings in the second generation that can be obtained from the figures shown above
- A. 3 : 1 : 3 : 1
 - B. 13 : 1 : 1 : 4
 - C. 9: 3 : 3 : 1
 - D. 1 : 1: 1 :1
37. What is the kind of inheritance concerning these two characters in *Drosophila*
- A. Independent assortment
 - B. Sex linkage
 - C. Autosomal linkage
 - D. Incomplete dominance
38. What is the distance between the two genes involved in the determination of these two characters
- A. 4.6
 - B. 10.8
 - C. 12.1
 - D. 16.2
39. Recombination has produced two of the phenotypes shown in question 28, which of these phenotypes are recombinants
- A. Cinnabar eyes, normal wings and red eyes, normal wings
 - B. Cinnabar eyes, vestigial wings and red eyes, normal wings
 - C. Red eyes, normal wings and cinnabar eyes, normal wings
 - D. Red eyes, vestigial wings and cinnabar eyes, normal wings
40. What is the name of the process that produced the recombinants
- A. Crossing over
 - B. Mutation
 - C. Substitution
 - D. Nondisjunction
41. When does this process occur during meiosis
- A. Interphase
 - B. Prophase

- C. Metaphase
- D. Anaphase

42. What is the factor that determines the degree of recombination that can happen between two genes

- A. Sex linkage
- B. Distance between the two genes
- C. Mutation
- D. DNA replication

43. What is the unit of distance between two genes on a chromosome

- A. Centimeter
- B. Centigram
- C. CentiMorgan
- D. Micrometer

44. Continuous variation involves a character with

- A. Few phenotypes
- B. Many phenotypes
- C. Many chromosomes
- D. Dominant gene

45. An example on continuous variation in humans is

- A. Blood groups
- B. Albinism
- C. Skin color
- D. Down syndrome

46. Discontinuous variation involves a character with

- A. Few phenotypes
- B. Many phenotypes
- C. Many chromosomes
- D. Dominant gene

47. Intraspecific hybridization is

- A. Mixing different pieces of DNA
- B. Mixing different pieces of RNA

- C. Breeding individuals of the same species
- D. Breeding individuals of different species

48. Interspecific hybridization is

- A. Mixing different pieces of DNA
- B. Mixing different pieces of RNA
- C. Breeding individuals of the same species
- D. Breeding individuals of different species

49. Inbreeding involves

- A. Breeding in closed areas
- B. Breeding related members of the family
- C. Breeding members from different families
- D. Breeding members from the same habitat

50. Hybrid vigor can be produced by

- A. Mating different varieties of animals
- B. Injecting a cow with hormones
- C. Injecting a cow with antibodies
- D. Injecting a cow with steroids

51. Polyploidy can result from

- A. Having an extra chromosome
- B. Having 2 extra chromosomes
- C. Multiple sets of chromosomes
- D. Fragmentation of chromosomes

52. A mule results from the breeding of a horse and a donkey. The mule is infertile because

- A. It is always a male
 - B. It is always a female
 - C. It is weaker than both parents
 - D. It does not have pairs of homologous chromosomes
-

Chapter 12

Digestion and Nutrition

1. An acidic medium exists in the following part of the digestive tract

- A. Esophagus
- B. Stomach
- C. Duodenum
- D. Large intestine

2. Absorption of water occurs mostly in the

- A. Esophagus
- B. Stomach
- C. Duodenum
- D. Large intestine

3. The process involved in digestion is

- A. Polymerization
- B. Hydrolysis
- C. Condensation
- D. Dehydration

4. Amylase breaks

- A. Proteins to amino acids
- B. Fat to fatty acids and glycerol
- C. Starch to maltose
- D. Starch to glucose

5. Absorption of digested food occurs in the

- A. Esophagus
- B. Stomach
- C. Small intestine
- D. Large intestine

6. The longest part of the digestive tract is the

- A. Oesophagus
- B. Ileum
- C. Duodenum
- D. Large intestine

7. What is the correct description in the following table

	Salivary glands	Pancreas	Small intestine	Large intestine
A	Amylase	Pepsin	Maltase	Water absorption
B	Amylase	Trypsin	Maltase	Water absorption
C	Maltase	Trypsin	Maltase	Lipase
D	Amylase	Pepsin	Sucrase	Water absorption

8. The blood vessel which carries digested food from the small intestine to the liver is the

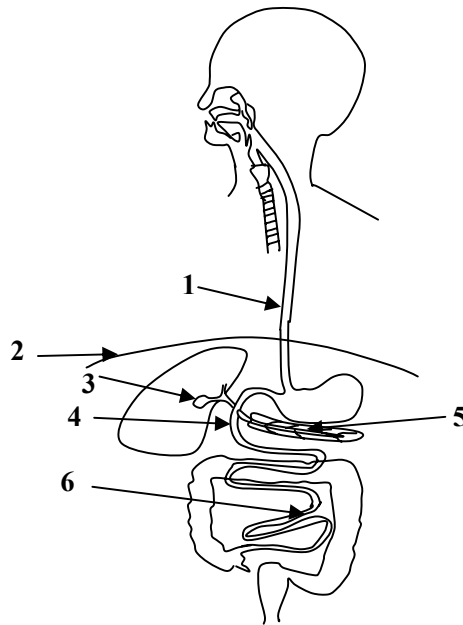
- A. Hepatic vein
- B. Hepatic artery
- C. Hepatic portal vein
- D. Mesenteric artery

9. Lymph vessels help in the absorption of

- A. Amino acids
- B. Fat
- C. Sugar
- D. Carbohydrates

10. Vitamins are important in the structure of

- A. Bile salts
- B. Coenzymes
- C. Enzymes
- D. Proteins



11. What are the labels on the numbered arrows

	1	2	3	4	5	6
A	Oesophagus	Diaphragm	Pancreas	Duodenum	Gall bladder	Small intestine
B	Oesophagus	Diaphragm	Gall bladder	Small intestine	Pancreas	Duodenum
C	Oesophagus	Diaphragm	Gall bladder	Duodenum	Pancreas	Small intestine
D	Oesophagus	Diaphragm	Gall bladder	Duodenum	Pancreas	Large intestine

12. Bile contains

- A. Cholesterol
- B. Enzymes
- C. Lipase
- D. Acid

13. The acid in the stomach is needed for the action of

- A. Lipase
- B. Pepsin
- C. Trypsin
- D. Amylase

14. Bile helps in

- A. Hydrolysis
- B. Emulsification
- C. Condensation
- D. Egestion

15. Bile is made in the

- A. Gall bladder
- B. Pancreas
- C. Liver
- D. Duodenum

16. A piece of steak can most efficiently be digested by

- A. Amylase
- B. Protease
- C. Lipase
- D. Carbohydrase

17. Plant fibers cannot be digested in humans because of the absence of

- A. Carbohydrase
- B. Protease
- C. Cellulase
- D. Fibrase

18. Sucrase breaks

- A. Monosaccharides
- B. Disaccharides
- C. Polysaccharides
- D. Proteins

19. The action of lipase is facilitated by

- A. Protease
- B. Bile
- C. Amylase
- D. Sucrase

20. Peristalsis functions in

- A. Chemical digestion
- B. Movement of food in the gut
- C. Absorption
- D. Secretion

21. Enzymes are secreted from all the following parts, except

- A. Pancreas
- B. Small intestine
- C. Stomach
- D. Gall bladder

22. Food is prevented from going back to the esophagus from the stomach by

- A. Peristalsis
- B. Mucous plug
- C. Smooth muscles
- D. Striated muscles

23. The gall bladder is important for facilitating the digestion of

- A. Proteins
- B. Lipids
- C. Fibers
- D. Vitamins

24. In an adult the length of the small intestine is about

- A. One meter
- B. 3 meters
- C. 6 meters
- D. 12 meters

25. Microvilli are

- A. Foldings of the cell membrane
- B. Cilia
- C. Hairs
- D. Blood capillaries

26. Blind vessels starting from each villus and merging into larger vessels for the transportation of fat are called

- A. Blood capillaries
- B. Arteries
- C. Veins
- D. Lymph vessels

27. Excess proteins in diet are

- A. Stored in the liver
- B. Stored in the gall bladder
- C. Changed into muscles
- D. Broken and partly removed

28. Inefficient reabsorption of water from the large intestine leads to

- A. Diarrhea
- B. Constipation
- C. Hydrolysis
- D. Oedema

29. A great number of villi is found in the

- A. Oesophagus
- B. Stomach
- C. Small intestine
- D. Large intestine

30. Symbiotic bacteria can be found mainly in the

- A. Oesophagus
- B. Stomach
- C. Small intestine
- D. Large intestine

31. Symbiotic bacteria in the digestive tract of humans help in

- A. Production of some vitamins
- B. Peristalsis
- C. Digestion
- D. Egestion

32. The appendix is an extension from the

- A. Oesophagus
- B. Duodenum
- C. Small intestine
- D. Large intestine

33. Blood capillaries in the villi, absorb mainly

- A. Fat
- B. Sugars and amino acids
- C. Fibers
- D. Cholesterol

34. Digestive enzymes

- A. Vary in their optimum pH
- B. Vary in their optimum temperature
- C. Work on the same substrate
- D. Compete for their substrate

35. A rice meal can be digested mainly by

- A. Proteases
- B. Lipase
- C. Carbohydrases
- D. Cellulase

36. Butter is mainly digested in the

- A. Mouth
- B. Stomach
- C. Duodenum
- D. Ileum

37. Roughage can be found in large amounts in

- A. Brown meat
- B. White meat
- C. Brown bread
- D. White bread

38. Food moves down the digestive tract by

- A. Gravity
- B. Peristalsis
- C. Exercise
- D. Being slippery

39. Proteases work in the

- A. Mouth and stomach
- B. Stomach and duodenum
- C. Small intestine and large intestine
- D. Mouth and duodenum

40. Carbohydrases work in the

- A. Mouth, duodenum and small intestine
- B. Mouth, stomach and small intestine
- C. Mouth, small intestine and large intestine
- D. Mouth, pancreas and small intestine

41. A balanced diet is needed for

- A. Preventing disease
- B. Providing enough energy
- C. Keeping the body fit
- D. All of the above

42. Digestion of starch takes place in the

- A. Mouth and stomach
- B. Mouth and intestine
- C. Stomach and intestine
- D. Mouth and pancreas

43. Digestion of proteins occurs in the

- A. Mouth and stomach
 - B. Mouth and intestine
 - C. Stomach and intestine
 - D. Mouth and pancreas
-

Chapter 13

The Transport System

1. The left ventricle contracts with a big force because

- A. It needs to pump blood to all parts of the body
- B. It has a big surface area
- C. It has thick muscular walls
- D. It contains oxygenated blood

2. The right ventricle sends

- A. Oxygenated blood to the body
- B. Deoxygenated blood to the body
- C. Oxygenated blood to the lungs
- D. Deoxygenated blood to the lungs

3. The pulmonary artery sends

- A. Oxygenated blood to the body
- B. Deoxygenated blood to the body
- C. Oxygenated blood to the lungs
- D. Deoxygenated blood to the lungs

4. The pulmonary vein sends

- A. Oxygenated blood to the body
- B. Deoxygenated blood to the body
- C. Oxygenated blood to the heart
- D. Deoxygenated blood to the heart

5. The site of exchange between the body and the circulation is the

- A. Venules
- B. Capillaries
- C. Arterioles
- D. Villi

6. Which of these vessels contains blood with the highest pressure

- A. Vena cava
- B. Pulmonary vein
- C. Renal artery
- D. Renal vein

7. The SAN is made of

- A. Nerve cells
- B. Blood capillaries
- C. Connective tissue
- D. Special cardiac tissue

8. The electric impulse in the heart is initiated in the

- A. SAN
- B. AVN
- C. Nervous system
- D. Brain stem

9. The cardiovascular center is located in the

- A. Wall of the vena cava
- B. Brain stem
- C. Cerebellum
- D. Cerebral cortex

10. Messages for changing the heart rate are sent from the brain to the

- A. SAN
- B. AVN
- C. Left ventricle
- D. Right ventricle**

11. Acetylcholine is secreted from the

- A. Sympathetic nerve endings and increase the heart rate
- B. Sympathetic nerve endings and decrease the heart rate
- C. Parasympathetic nerve endings and increase the heart rate
- D. Parasympathetic nerve endings and decrease the heart rate

12. Adrenaline

- A. Decreases the heart rate
- B. Increases the heart rate
- C. Decreases the breathing rate
- D. Increases blood flow to the skin

13. Adrenaline is similar in its action to

- A. Acetylcholine
- B. Noradrenaline
- C. Insulin
- D. Pepsin

14. The blood comes back to the heart from the body

- A. With high pressure
- B. With low pressure
- C. With Oxygen
- D. In arteries

15. Valves are present in

- A. All arteries
- B. Capillaries
- C. Arterioles
- D. Heart

16. The valve in the pulmonary artery prevents the blood from returning to the

- A. Left ventricle when it relaxes
- B. Right ventricle when it relaxes
- C. Left atrium when the ventricle contracts
- D. Right atrium when the ventricle contracts

17. The valve in the aorta prevents the blood from returning to the

- A. Left ventricle when it relaxes
- B. Right ventricle when it relaxes
- C. Left atrium when the ventricle contracts
- D. Right atrium when the ventricle contracts

18. The tricuspid valve prevents the blood from returning to the

- A. Right atrium when the right ventricle contracts
- B. Left atrium when the left ventricle contracts
- C. Left ventricle when it relaxes
- D. Right ventricle when it relaxes

19. The left and right sides of the heart are normally

- A. Completely separated after birth
- B. Connected with an artery
- C. Connected with a vein
- D. Connected with channels

20. The thinnest walls of heart walls are owned by the

- A. Left ventricle
- B. Right ventricle
- C. Atria
- D. Depends on physical activity

21. Deoxygenated blood enters the right atrium through the

- A. Pulmonary artery
- B. Pulmonary vein
- C. Vena cava
- D. Aorta

22. The blood is pushed from the right atrium to the right ventricle through the

- A. Bicuspid valve
- B. Tricuspid valve
- C. Semilunar valve
- D. Mitral valve

23. The pulmonary vein carries

- A. Oxygenated blood to the left atrium
- B. Oxygenated blood to the right atrium
- C. Deoxygenated blood to the right ventricle
- D. Deoxygenated blood to the left ventricle

24. The coronary arteries branch from the

- A. Aorta
- B. Vena cava
- C. Pulmonary vein
- D. Right ventricle

25. The pulmonary artery exits from the

- A. Right atrium
- B. Right ventricle
- C. Left atrium
- D. Left ventricle

26. The SAN

- A. Is located in the left ventricle
- B. Releases acetylcholine
- C. Initiates electric waves
- D. Is connected to the bundle of His

27. The AVN sends electric impulse to the

- A. Brain
- B. Atria
- C. Ventricles
- D. Parasympathetic nerve

28. The endothelial tissue is present

- A. Only in capillaries
- B. Only in arteries
- C. Only in veins
- D. In all three types of blood vessels

29. Plasma proteins function in

- A. Respiration
- B. Active transport
- C. Exocytosis
- D. Reabsorption of tissue fluid

30. Heart disease is mostly caused by high

- A. LDL
- B. HDL
- C. Proteins
- D. Amino acids

31. Atherosclerosis can be caused by

- A. High protein diet
- B. High cholesterol
- C. High fiber diet
- D. High calcium diet

32. The right side of the heart contains

- A. Oxygenated blood
- B. Deoxygenated blood
- C. Oxygenated in the atrium and deoxygenated in the ventricle
- D. Deoxygenated in the atrium and oxygenated in the ventricle

33. Cardiac output is a product of

- A. Heart rate and breathing rate
- B. Heart rate and breathing depth
- C. Heart rate and stroke volume
- D. Breathing rate and depth

34. Heart rate is

- A. Higher in an athlete
- B. Lower in an athlete
- C. Fixed according to age
- D. Fixed according to sex

35. Physical training

- A. Lowers the heart rate and increases stroke volume
- B. Increases the heart rate and decreases stroke volume
- C. Lower the heart rate and lowers stroke volume
- D. Increases the heart rate and increases stroke volume

36. Increased HDL can result from

- A. Smoking
- B. Eating unsaturated fat
- C. Doing exercise
- D. A high protein diet

37. Decreased LDL can result from

- A. Smoking
- B. Eating unsaturated fat
- C. Doing exercise
- D. A high fiber

38. Blood capillaries have

- A. Muscular wall
- B. Connective tissue
- C. Elastic fibers
- D. Endothelial cells

39. Exchange of substances between capillaries and body cells occurs by

- A. Diffusion only
- B. Osmosis only
- C. Active transport only
- D. All of the above

40. A low protein diet lowers the rate of reabsorption of interstitial fluid back into

- A. Blood capillaries
- B. Veins
- C. Arteries
- D. Arterioles

41. The pulmonary circulation exists between the

- A. Heart and the body
- B. Heart and the lungs
- C. Lungs and the body
- D. Left and right sides of the lungs

42. The systemic circulation exists between the

- A. Heart and the body
- B. Heart and the lungs
- C. Lungs and the body
- D. Left and right sides of the lungs

43. Blood comes back to the heart from the body through the

- A. Aorta
- B. Vena cava
- C. Pulmonary vein
- D. Right ventricle

44. Blood capillaries branch from the

- A. Veins
- B. Heart
- C. Aorta
- D. Arterioles

45. The left ventricle pushes blood into the

- A. Vena cava
 - B. Right ventricle
 - C. Aorta
 - D. Left atrium
-

Chapter 14

Gas Exchange

1. Exchange of gases takes place between

- A. Alveoli and veins
- B. Bronchioles and capillaries
- C. Alveoli and capillaries
- D. Bronchioles and veins

2. Flattening of the diaphragm is followed by

- A. Inhale
- B. Exhale
- C. Expiration
- D. Cessation of breathing

3. Increased blood acidity during exercise is caused by

- A. Decreased oxygen
- B. Increased oxygen
- C. Increased carbon dioxide
- D. Decreased carbon dioxide

4. During a sprint race, compared to a non trained person, a trained athlete shows the following responses

- A. Higher breathing rate and lower breathing depth
- B. Higher breathing rate and depth
- C. Lower breathing rate and depth
- D. Lower breathing rate and higher breathing depth

5. Asthma can result from

- A. Smoking
- B. Not doing exercise
- C. Cholesterol
- D. Saturated fat

6. Emphysema can result from

- A. Smoking
- B. Not doing exercise
- C. Cholesterol
- D. Saturated fat

7. Chemosensors are present in the

- A. Pulmonary artery
- B. Pulmonary vein
- C. Aorta
- D. Capillaries

8. Chemosensors send messages to the

- A. Arteries
- B. Veins
- C. Brain center
- D. Diaphragm

9. To increase the ventilation rate, the breathing center in the brain sends messages to the

- A. Blood vessels
- B. Left ventricle
- C. Right ventricle
- D. Diaphragm

10. Tidal volume is the

- A. Amount of air taken in during exercise
- B. Amount of air taken in at rest
- C. Rate of breathing during rest
- D. Rate of breathing during exercise

11. Increased blood acidity during exercise is due to the increased level of

- A. Hydrogen ions
- B. Electrons
- C. Oxygen
- D. Hydrochloric acid

12. Oxygen enters the capillaries by:

- A. Osmosis
- B. Diffusion.

- C. Facilitated diffusion
- D. Active transport

13. The concentration of carbon dioxide is higher in the

- A. Pulmonary vein than the pulmonary artery
- B. Pulmonary artery than the pulmonary vein
- C. Left ventricle than the right ventricle
- D. Pulmonary vein than the vena cava

14. Inhale is a result of

- A. Increased volume of ribcage
- B. Decreased volume of ribcage
- C. Increased relaxation of the diaphragm
- D. Increased relaxation of the intercostal muscles

15. Contraction of the intercostal muscles results in movement of the ribcage

- A. Upward and backward
- B. Upward and forward
- C. Downward and backward
- D. Downward and forward

16. Exercise results in

- A. Increased blood pH
- B. Decreased blood pH
- C. Decreased blood acidity
- D. Increased blood alkalinity

17. Alveoli are the end points of

- A. Blood capillaries
- B. Bronchi
- C. Bronchioles
- D. Gristles

18. Gristles are present in the walls of the

- A. Blood capillaries
- B. Bronchi
- C. Alveoli
- D. Diaphragm

19. The percentages of gases in the atmosphere is one of the following

	Carbon dioxide	Oxygen	Nitrogen
A	0.3	20	78
B	0.03	28	70
C	0.03	0.3	78
D	0.03	20	78

20. The flow of blood in the capillaries surrounding the alveoli is

- A. Higher than that in the arteries
- B. Lower than that in the arteries
- C. Higher than that in the aorta
- D. Higher than that in the renal artery

21. Ventilation is maintained by the action of the following sets of muscles

- A. Esophagus and trachea
- B. Diaphragm and trachea
- C. Diaphragm and intercostal muscles
- D. Intercostal and abdominal muscles

22. The change in heart rate after exercise is brought about by orders from

- A. The diaphragm
- B. The intercostal muscles
- C. The brain
- D. The nose

23. The structures which fill with air after inhale are the

- A. Arteries
- B. Veins
- C. Ventricles
- D. Alveoli

24. The percentage of carbon dioxide in exhale is around

- A. 0.5
- B. 1
- C. 2
- D. 4

25. The percentage of oxygen in exhale is around

- A. 2
- B. 4
- C. 8
- D. 16

26. Increased carbon dioxide in the blood causes

- A. Increased acidity
- B. Increased alkalinity
- C. Increased diaphragm relaxation
- D. Decreased breathing rate

27. Chemosensors are present in the

- A. Diaphragm
- B. Skin
- C. Blood vessels
- D. Intercostal muscles

28. Oxygen is carried from the alveoli by the

- A. Pulmonary artery
- B. Pulmonary vein
- C. Aorta
- D. Vena cava

29. Cartilage rings are incomplete at the back of the trachea to allow

- A. Digestion
- B. Swallowing
- C. Breathing
- D. Gas exchange

30. Alveoli are surrounded by

- A. Blood capillaries
- B. Cartilage
- C. Skin
- D. Bone

31. Blood arrives at the lungs in the

- A. Pulmonary artery
- B. Pulmonary vein
- C. Hepatic artery
- D. Hepatic vein

32. Blood leaving the lungs return to the heart through the

- A. Pulmonary artery
- B. Pulmonary vein
- C. Hepatic artery
- D. Hepatic vein

33. Training results in

- A. Increased rate of breathing
- B. Increased depth of breathing
- C. Decreased lung capacity
- D. Increased percentage of oxygen entering the lungs

34. Training results in

- A. Increased heart rate
- B. Increased stroke volume
- C. Increased pulse rate
- D. Decreased cardiac output

35. Cardiac output =

- A. Heart rate x breathing rate
- B. Heart rate x breathing depth
- C. Heart rate x stroke volume
- D. Breathing rate x tidal volume

36. The decrease in blood pH during exercise is due to

- A. Hydrogen ions
 - B. Bicarbonate ions
 - C. Lactic acid
 - D. HCl
-

Chapter 15

The Immune System

1. Vaccination with a killed pathogen produces

- A. Passive artificial immunity
- B. Active artificial immunity
- C. Passive natural immunity
- D. Active natural immunity

2. Vaccination with antibodies produces

- A. Passive artificial immunity
- B. Active artificial immunity
- C. Passive natural immunity
- D. Active natural immunity

3. When you are infected by contacting an infected person you gain

- A. Passive artificial immunity
- B. Active artificial immunity
- C. Passive natural immunity
- D. Active natural immunity

4. A mother gives her baby antibodies through the placenta. This is an example of

- A. Passive artificial immunity
- B. Active artificial immunity
- C. Passive natural immunity
- D. Active natural immunity

5. In diagnosis of a disease using antibodies against that disease

- A. Agglutination in the container indicates the presence of the disease
- B. Agglutination in the container indicates the absence of the disease
- C. A clear solution indicates the presence of antibodies
- D. A clear solution indicates the presence of the disease

6. Tissue rejection is due to the tissue being considered a foreign

- A. Antigen
- B. Antibody
- C. Gene

D Antibiotic

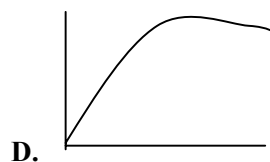
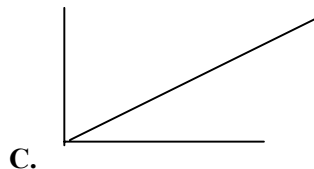
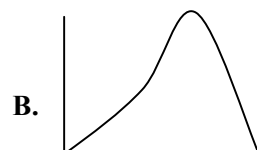
7. B lymphocytes proliferate when they meet

- A. Antigens
- B. Antibodies
- C. Antibiotics
- D. Phagocytes

8. Passive artificial immunity can be produced by:

- A. Injection of bacteria
- B. Injection of viruses
- C. Injection of antibodies
- D. Injection of antigens

9. Active immunity can be represented by one of the following graphs. In each graph the y-axis represents the level of immunity, while the x-axis represents time



10. In vaccination against polio, the following is injected

- A. Killed viruses
- B. Killed bacteria
- C. Heat treated bacteria
- D. Fragments of bacteria

11. B lymphocytes are involved in the

- A. Non specific immune response
- B. Specific immune response
- C. Specific or non specific response, depending on the antigen
- C. Specific or non specific response, depending on the antibody

12. In monoclonal antibody techniques, B lymphocytes are mixed with

- A. Healthy B lymphocytes
- B. Cancerous B lymphocytes
- C. Antigens
- D. Antibodies

13. Antibodies are made of

- A. Proteins in their primary structure
- B. Proteins in their secondary structure
- C. Proteins in their tertiary structure
- D. Proteins in their quaternary structure

14. Antibodies have the following number of sites for binding with the antigens

- A. 1
- B. 2
- C. 3
- D. 4

15. When two solutions one containing antigens and the other containing antibodies for these antigens are mixed together the following will occur

- A. Agglutination
- B. Condensation
- C. Dehydration
- D. Proliferation

16. Interferon is produced by

- A. Viruses
- B. Bacteria
- C. Cells infected with viruses
- D. Cells infected with bacteria

17. MHC is

- A. A group of antigens that attack antibodies
- B. Substances produced by B lymphocytes
- C. Substances produced by T lymphocytes
- D. A group of genes that control the type of antigens in an individual

18. No two individuals in the world have the same MHC (except identical twins)

because

- A. The antibodies are different
- B. The blood proteins are different
- C. One gene is involved
- D. Many genes and alleles are involved

19. T lymphocytes are

- A. Produced in the liver
- B. Produced in the thymus
- C. Mature in the thymus
- D. Mature in the bone marrow

20. Cytotoxic T cells

- A. Destroy bacteria directly
- B. Destroy viruses
- C. Cause lysis to Bacteria
- D. Cause lysis to body cells infected with pathogens

21. The skin and mucous membranes

- A. Belong to the specific immune system
- B. Belong to the non specific immune system
- C. They can be specific or non specific depending on the type of pathogen
- D. They are specific only against bacteria

22. Phagocytes are

- A. Specific in their action
- B. Nonspecific in their action
- C. Antibody carriers
- D. Cell mediated antibodies

23. B lymphocytes

- A. Become amoeboid when encountering antigens
- B. Become amoeboid when encountering pathogens
- C. Produce interferon
- D. Produce antibodies

24. Antibodies are

- A. Immunoglobulins
- B. Immunosuppressors
- C. Produced by fungi
- D. Released by fibrinogens

25. The main type of antibody present in saliva, milk and tears is

- A. IgG
- B. IgA
- C. IgM
- D. IgD

26. Monoclonal antibody techniques are used to produce

- A. A mixture of different antigens
- B. One type of antigens
- C. A mixture of different antibodies
- D. One type of antibodies

27. Concerning blood groups in which of the following cases would the baby's blood clot.

	Mother	Baby
A	A positive	A negative
B	O negative	O positive
C	B positive	A positive
D	AB negative	O negative

Study the following tables that show the results of blood tests then answer questions

28 - 33

Table 1.

Anti A	Ani B	Anti RH
Agglutination	Agglutination	No agglutination

28. The person tested in table I above must belong to blood group:

- A. O negative
- B. O positive

- C. AB negative
- D. AB positive

Table 2.

Anti-A	Anti-B	Anti-Rh
No agglutination	No agglutination	Agglutination

29. The person tested in table 2 above must belong to blood group:

- A. A positive
- B. AB negative
- C. O positive
- D. O negative

Table 3.

Anti-A	Anti-B	Anti-Rh
Agglutination	No agglutination	Agglutination

30. The person tested in table 3 above must belong to blood group:

- A. A positive
- B. B positive
- C. AB positive
- D. AB negative

Table 4.

Anti-A	Anti-B	Anti-Rh
No agglutination	No agglutination	No agglutination

31. The person tested in table 4 above must belong to blood group:

- A. AB positive
- B. AB negative
- C. O positive
- D. O negative

Table 5.

Anti-A	Anti-B	Anti-Rh
Agglutination	Agglutination	Agglutination

32. The person tested in table 5 above must belong to blood group:

- A. A positive
- B. B positive
- C. AB positive
- D. AB negative

Table 6.

Anti-A	Anti-B	Anti-Rh
No agglutination	Agglutination	Agglutination

33. The person tested in table I above must belong to blood group:

- A. A positive
- B. B positive
- C. A negative
- D. B negative

34. Study the following table about the blood groups of 4 people

Person	Blood group
1	A
2	B
3	AB
4	O

Blood transfusion is safe in one of the following cases

- A. From 1 to 2
- B. From 3 to 2
- C. From 3 to 4
- D. From 4 to 3

35. Agglutination of blood means

- A. Bleeding
- B. Hemorrhage
- C. Clotting
- D. Liquidation

36. Polio is caused by

- A. Low protein diet
- B. Low calcium diet
- C. Bacterial infection
- D. Viral infection

37. Vaccination can result in the formation of

- A. Antigens
- B. Antibodies
- C. Antibiotics
- D. Lymph nodes

38. Pathogens are

- A. Antigens
- B. Antibodies
- C. Antibiotics
- D. Lymph nodes

39. Active natural immunity is produced by

- A. Infection with the disease
- B. Injection with weak pathogens
- C. Transfer of antibodies from mother to baby
- D. Injection of antigens

40. Interferon causes cells to produce

- A. Antibacterial enzymes
- B. Antiviral enzymes
- C. Antibodies
- D. Antibiotics

41. MHC is identical in

- A. A brother and sister
- B. Two unrelated people
- C. Mother and her baby
- D. None of the above

42. Long term immunity can be gained through the action of

- A. Plasma cells
- B. Memory cells
- C. T lymphocytes
- D. Cytotoxic T cells

43. Phagocytes contain a large number of

- A. Golgi complex
- B. Antibodies
- C. Lysosomes
- D. Mitochondria

44. The antibodies attached to the surface of the B lymphocytes and released in the initial encounter with the pathogen, belong to one of the following types of immunoglobulin

- A. IgG
- B. IgA
- C. IgD
- D. IgM

45. The ELISA test for diagnosing diseases is based on the activity of

- A. Competitive inhibitors
- B. Non competitive inhibitors
- C. Allosteric activators
- D. Enzymes

46. When you transfer blood between people, it is important to determine the following

- A. The antigen of the recipient and the antibodies of the donor
- B. The antibodies of the recipient and the antigens of the donor
- C. The antibodies of the recipient and the antigens of the recipient
- D. The antigens of the donor and the antibodies of the donor

47. In blood transfusion a reaction and a consequent clotting (agglutination) might occur between

- A. Antigen A and antibody A
- B. Antigen A and antibody B
- C. Antigen A and antibody O
- E. Antibody A and antibody B

48. Antigens have a protein part, the synthesis of which is controlled by

- A. Antibodies
- B. MHC
- C. Interferon
- D. B lymphocytes

49. A secondary response to an antigen can be gained after

- A. The ELISA test
- B. Diagnosis
- C. A second exposure to the antigen
- D. A second exposure to the antibody

50. A pregnant woman is injected with immunosuppressor drugs if she is

- A. Positive and the baby is negative
 - B. Negative and the baby is positive
 - C. Negative and the father is positive
 - D. Positive and the father is negative
-

Chapter 16

The Nervous System

- 1. The resting potential of a neuron is characterized by**
 - A. High potassium concentration outside the axon
 - B. High sodium concentration inside
 - C. High sodium concentration outside
 - D. Low sodium concentration outside
- 2. The rising phase of the action potential is due to the**
 - A. Entry of potassium ions
 - B. Exiting of potassium ions
 - C. Entry of sodium ions
 - D. Exiting of sodium ions
- 3. The falling phase of the action potential is due to the**
 - A. Entry of sodium ions
 - B. Exiting of sodium ions
 - C. Entry of potassium ions
 - D. Exiting of potassium ions
- 4. The short period of time when the nerve is not responsive to stimuli is termed the**
 - A. Adaptation period
 - B. Accommodation period
 - C. Refractory period
 - D. Resting period
- 5. Depolarization of the axon occurs due to the**
 - A. Entry of sodium ions
 - B. Exiting of sodium ions
 - C. Entry of potassium ions
 - D. Exiting of potassium ions
- 6. When a nerve impulse reaches the nerve endings the permeability of the**
 - A. Presynaptic membrane to potassium increases
 - B. Presynaptic membrane to sodium decreases

- C. Presynaptic membrane to calcium increases
- D. Presynaptic membrane to calcium decreases

7. At a neuromuscular junction the nerve impulse travels through the

- A. Pores in the membrane
- B. Cytoplasmic streaming
- C. Calcium channels
- D. Synapse

8. Within a neuron an impulse travels

- A. In all directions
- B. From cell body to axon
- C. From axon to cell body
- D. From axon to dendrites

9. A neurotransmitter works

- A. In the axon
- B. On the presynaptic membrane
- C. On postsynaptic membrane
- D. On the myelin sheath

10. Neurotransmitters are released from the

- A. Dendrites
- B. Nerve endings
- C. Axon
- D. Medulla

11. Cranial nerves branch from

- A. The vertebral column
- B. Rib cage
- C. Spinal cord
- D. Brain

12. Sympathetic nerves belong to the

- A. Voluntary nerves
- B. Optic nerve
- C. Dorsal root ganglion
- D. Autonomic nervous system

13. The vesicles containing neurotransmitters proceed into exocytosis due to,

- A. Entry of sodium into the presynaptic membrane
- B. Exiting of sodium from the presynaptic membrane
- C. Entry of calcium ions into the presynaptic membrane
- D. Exiting of calcium ions from the presynaptic membrane

14. The entry of sodium into the axon causes

- A. Depolarization of the membrane
- B. Increased negativity inside the axon
- C. The refractory period
- D. A resting potential

15. Exocytosis in the nerve endings is triggered by

- A. Sodium
- B. Calcium
- C. Chlorine
- D. Proteins

16. The sodium-potassium pump does not have to work in the

- A. Myelinated parts of the axon
- B. Nodes
- C. Nerve endings
- D. Dendrites

17. The myelin sheath is mostly made of

- A. Proteins
- B. Fat
- C. Carbohydrates
- D. Nucleotides

18. When an action potential is at its peak level in a nerve, a preceding spot on the axon is in its

- A. Active state
- B. Refractory period
- C. Declining phase of action potential
- D. Depolarized

19. The amplitude of the action potential in millivolts, is about

- A. 40
- B. 80
- C. 120
- D. 180

20. The myelin sheath helps in

- A. Releasing the neurotransmitter
- B. Refractory period
- C. Making the impulse travel at a greater speed
- D. Making the impulse travel in one direction

21. In a myelinated axon the nerve impulse travels from

- A. Schwann cell to nodes
- B. Node to node
- C. Myelin to myelin
- D. Axon to myelin

22. The nodes are the areas on the axon which

- A. Have no myelin sheath
- B. Have no cytoplasm
- C. Do not allow movement of ions
- D. Do not allow changes in permeability

23. At the synapse the nerve impulse travels from

- A. Post synaptic to presynaptic membrane
- B. Presynaptic to postsynaptic membrane
- C. The neurotransmitters to the vesicles
- D. Calcium channels to the membrane receptors

24. At the synapse the nerve impulse travels slower than in the axon because

- A. A chain of events occurs at the synapse
- B. The axon contains acetylcholine
- C. At the synapse the membranes are insulated
- D. At the synapse there are less nodes

25. During the refractory period the

- A. Nerve can respond to stimuli
- B. Nerve does not respond to stimuli
- C. Sodium potassium pump can not work
- D. Sodium cannot move out

26. The cell bodies of the sensory neurons are situated in the

- A. Gray matter
- B. White matter
- C. Dorsal root ganglion
- D. Ventral root

27. The cell bodies of the motor neurons are situated in the

- A. Gray matter
- B. White matter
- C. Dorsal root ganglion
- D. Ventral root

28. The cell bodies of the intermediate neurons are situated in the

- A. Gray matter
- B. White matter
- C. Dorsal root ganglion
- D. Ventral root

29. The direction of nerve impulse in the reflex action occurs in the following sequence

- A. Motor neuron, sensory neuron, intermediate neuron.
- B. Intermediate neuron, sensory neuron, motor neuron.
- C. Sensory neuron, motor neuron, intermediate neuron.
- D. Sensory neuron, intermediate neuron, motor neuron.

30. The spinal cord is protected by the

- A. Bone marrow
- B. Ribcage
- C. Vertebral column
- D. Fat tissue

31. The spinal nerves branch form the

- A. Brain
- B. Spinal cord
- C. Vertebral column
- D. Ribcage

32. Sensory neurons send nerve impulses to the

- A. Muscles
- B. Glands
- C. Peripheral nervous system
- D. Central nervous system

33. Motor neurons take messages to the

- A. Muscles
- B. Glands
- C. Peripheral nervous system
- D. Central nervous system

34. The CNS is connected to all part of the body through the

- A. Muscles
- B. Glands
- C. Peripheral nervous system
- D. Central nervous system

35. The CNS is made of the

- A. Sensory and motor neurons
- B. Brain and spinal cord
- C. Spinal nerves
- D. Cranial nerves

36. Stimuli are received by specialized

- A. Motor neurons
- B. Sensory neurons
- C. Muscle cells
- D. Intermediate neurons

37. Mechanoreceptors are involved in

- A. Vision
- B. Hearing
- C. Control of blood pH
- D. Osmoregulation

38. The reflex arc is

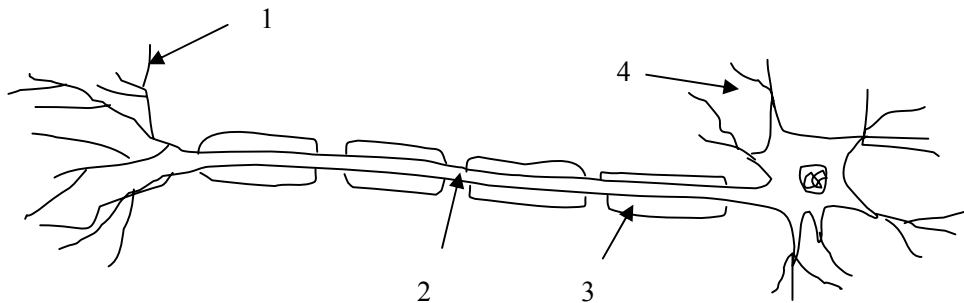
- A. Involuntary
- B. Voluntary
- C. Involves the brain
- D. Involves the vertebral column

39. A nerve impulse can travel from

- A. A motor neuron to a muscle
- B. A muscle to a motor neuron
- C. A sensory neuron to a muscle
- D. A motor neuron to the spinal cord

40. The following parts belong to the peripheral nervous system

- A. Brain and spinal nerves
- B. Brain and spinal cord
- C. Spinal nerves and cranial nerves
- D. Cranial nerves and spinal cord



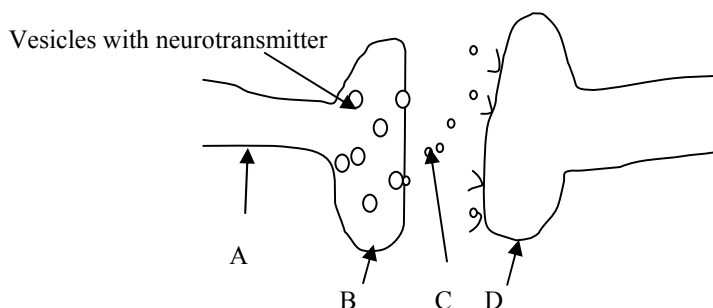
41. In the above diagram of a motor neuron, the numbered structures are:

	1	2	3	4
A	Dendrites	Node of Ranvier	Schwann cell	Nerve endings
B	Dendrites	Myelin sheath	Schwann cell	Nerve endings
C	Nerve endings	Axon	Schwann cell	Dendrites

D	Sensory receptor	Axon	Schwann cell	Dendrites
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42. When the action potential is at its peak at a certain point of the axon, the previous point is at its

- A. Resting potential
- B. Refractory period
- C. Depolarization
- D. Peak of action potential

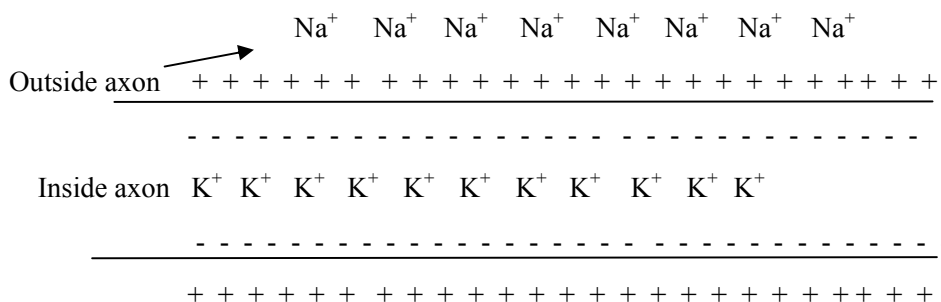


43. In the above diagram of a synapse, the action potential will travel from

- A. B to A
- B. D to C
- C. C to B
- D. B to D

44. The vesicles containing neurotransmitters are present in

- A. The axon
- B. The dendrites
- C. The nerve endings
- D. The myelin sheath

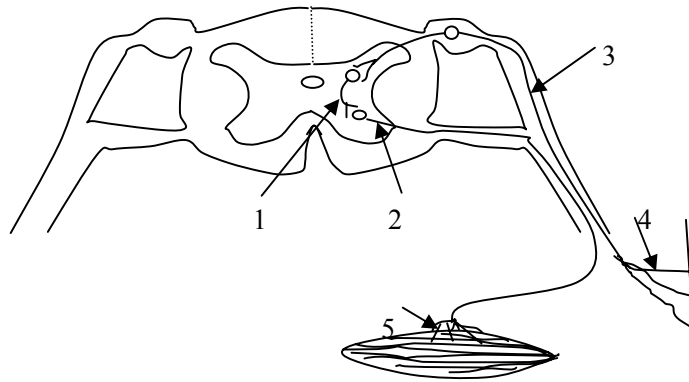


45. The above diagram shows the distribution of ions at

- A. Resting potential

- B. Action potential
- C. Depolarization
- D. Reverse polarization

Study the following diagram of a reflex arc, then answer questions 46 and 47



46. Which row shows the correct labelling of the above structures

	1	2	3	4	5
A	Intermediate neuron	Sensory neuron	Motor neuron	Sensory receptor	Neuromuscular junction
B	Intermediate neuron	Motor neuron	Sensory neuron	Sensory receptor	Neuromuscular junction
C	Intermediate neuron	Motor neuron	Sensory neuron	Effector	Neuromuscular junction
D	Relay neuron	Motor neuron	Sensory neuron	Neuromuscular junction	Sensory receptor

47. The pathway of the reflex arc occurs in the following sequence

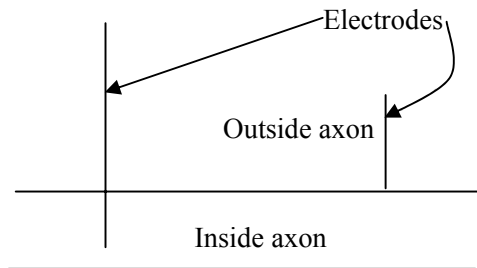
- A. 4, 1, 3, 2, 5
- B. 5, 2, 1, 3, 4
- C. 4, 3, 1, 2, 5
- D. 5, 4, 3, 1, 2

48. The resting potential is maintained by

- A. Stimulation
- B. Sodium potassium pump
- C. Passive transport
- D. Osmosis

49. Sensory neurons carry nerve impulses to the

- A. Skin
- B. Glands
- C. Central nervous system
- D. Muscles



50. The diagram above shows one electrode inside the axon and another outside the axon at rest, if these electrodes are connected to an oscilloscope, then the voltage that will be measured equals about

- A. Zero
- B. 10 mV
- C. -70 mV
- D. -70 V

51. When the nerve is depolarized, it has a potential of

- A. Zero
 - B. 40 mV
 - C. -70 mV
 - D. -70 V
-

Chapter 17

The Muscular System

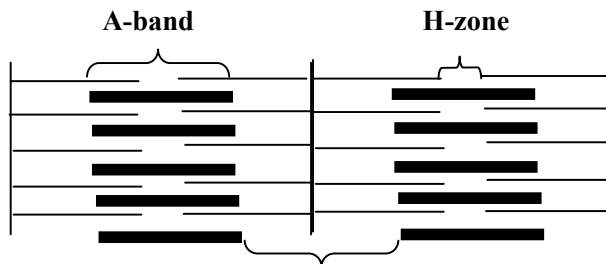
1. Which of the following descriptions of muscle types is correct:

A	Skeletal	Striated	Voluntary
B	Skeletal	Unstriated	Voluntary
C	Smooth	Unstriated	Voluntary
D	Cardiac	Unstriated	Involuntary

2. Which of the following descriptions of tendons and ligaments is correct:

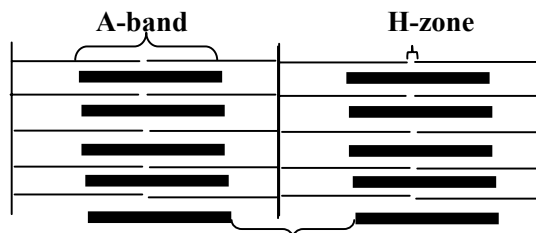
A	Tendon	Elastic	Connects between muscle and bone
B	Tendon	Inelastic	Connects between bone and bone
C	Ligament	Inelastic	Connects between muscle and bone
D	Ligament	Elastic	Connects between bone and bone

Study the following diagrams, then answer question 3



I-band

Two sarcomeres in a relaxed muscle



I-band

Two sarcomeres in a contracted muscle

3. When a sarcomere contracts

- A. The A band stays the same
- B. The A band shortens
- C. The I band stays the same
- D. The H band stays the same

4. Which statement is correct

- A. Actin is a globular protein
- B. Actin is a fibrous protein
- C. Myosin has myosin binding sites
- D. Tropomyosin is attached to the myosin filaments

5. The calcium binding sites are present on the

- A. Troponin
- B. Tropomyosin
- C. Actin
- D. Myosin

6. Following the binding of calcium to the calcium binding sites,

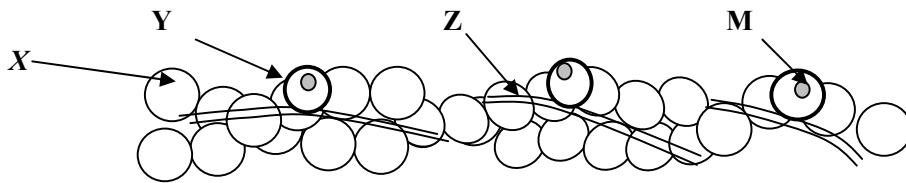
- A. The troponin binding sites are exposed
- B. The myosin binding sites are exposed
- C. Tropomyosin attaches to actin
- D. Troponin attaches to actin

7. Smooth muscles are

- A. Striated
- B. Unstriated
- C. Voluntary
- D. Skeletal

8. Cardiac muscles are

- A. Striated
- B. Unstriated
- C. Voluntary
- D. Skeletal



9. In the above diagram of an actin filament, which of the following lines show the correct labelling of the different parts:

	X	Y	Z	M
A	Troponin	Actin	Tropomyosin	Calcium binding site
B	Actin	Troponin	Tropomyosin	Myosin binding site
C	Actin	Troponin	Tropomyosin	Calcium binding site
D	Actin	Tropomyosin	Troponin	Calcium binding site

10. Myosin binding sites are located on

- A. Myosin
- B. Actin
- C. Troponin
- D. Tropomyosin

11. Myosin head releases actin, when

- A. Myosin attaches to ADP
- B. Myosin reacts with ATP
- C. Actin attaches to ATP
- D. Actin attaches to ADP

12. The myosin binding sites are blocked by

- A. Actin
- B. Myosin
- C. Troponin
- D. Tropomyosin

13. When action potential arrives at a muscle fiber, calcium ions are released from the

- A. Actin molecules
- B. Cytoplasm
- C. Sarcoplasmic reticulum

- D. Sarcomeres

14. When calcium ions are released, they bind to

- A. Actin
- B. Myosin
- C. Troponin
- D. Tropomyosin

15. When tropomyosin shifts position, the

- A. Myosin binding sites are exposed
- B. The actin binding sites are exposed
- C. Actin binding sites are blocked
- D. Troponin binding sites are exposed

16. When actin and myosin slide over each other

- A. Myosin filaments are pulled to the center of the sarcomere
- B. Actin filaments are pulled to the center of the sarcomere
- C. Tropomyosin filaments are pulled to the center of the sarcomere
- D. Troponin filaments are pulled to the center of the sarcomere

17. During strenuous exercise, muscle cramps (stiffness) occur due to the lack of

- A. ADP
- B. ATP
- C. NAD
- D. FAD

18. If ATP is absent during contraction

- A. Myosin does not break from troponin
- B. Troponin does not break from actin
- C. Myosin does not break from actin
- D. Actin does not break from troponin

19. Actin is a

- A. Fibrous protein
- B. Globular protein
- C. A nucleotide

- D. An amino acid

20. Myosin is a

- A. Globular protein with a carbohydrate head
- B. Globular protein with a fibrous chain wrapped around it
- C. Fibrous protein with a haem group
- D. Fibrous protein with a globular head

21. In striated muscles, striations are produced by the

- A. Sarcoplasmic reticulum
- B. Muscle fibers
- C. Endoplasmic reticulum
- D. Arrangement of actin and myosin

22. The sequence of events leading to muscle contraction, takes place as the following

- A. Action potential, release of calcium ions, sliding of filaments, calcium binds to troponin
- B. Action potential, release of calcium ions, calcium binds to troponin, sliding of filaments
- C. Action potential, sliding of filaments, release of calcium ions, calcium binds to troponin
- D. Action potential, release of myosin heads, sliding of filaments, release of calcium ions

23. voluntary muscles, such as the biceps in the arm, are supplied by

- A. Autonomic nerves
- B. Sympathetic nerves
- C. Parasympathetic nerves
- D. Somatic nerves

24. Involuntary nerves are

- A. Autonomic
- B. Somatic
- C. Striated
- D. Unstriated

25. The functional unit of a striated muscle is a

- A. Muscle cell
- B. Actin

- C. Myosin
- D. Sarcomere

26. One sarcomere extends between two adjacent

- A. H-zones
- B. A-bands
- C. I-bands
- D. Z-lines

27. Troponin is

- A. A rope like protein wrapped around the actin chains
- B. A rope like protein wrapped around myosin
- C. A globular protein situated at regular intervals on tropomyosin
- D. A fibrous protein with globular heads

28. Tropomyosin is

- A. A rope like protein wrapped around the actin chains
- B. A rope like protein wrapped around myosin
- C. A globular protein situated at regular intervals on tropomyosin
- D. A fibrous protein with globular heads

29. In a joint, the synovial fluid acts as a

- A. Neurotransmitter
- B. Lubricant
- C. Temperature regulator
- D. Nourishment for the bone

30. When the biceps relaxes

- A. The arm extends
- B. The arm bends
- C. The triceps relaxes
- D. The biceps elongates**

Chapter 18

Homeostasis

- 1. The main source of heat generation in the body of mammals comes from**
 - A. The sun
 - B. The laying of skin hair
 - C. Metabolic activities
 - D. Vasoconstriction

- 2. Endotherms depend on the following as a source of heat energy**
 - A. The surrounding environment
 - B. The sun
 - C. Respiration
 - D. Convection

- 3. Thyroxin is released by the**
 - A. Thyroid gland
 - B. Pituitary gland
 - C. Hypothalamus
 - D. Adrenal gland

- 4. TRH (thyroid releasing hormone) stimulates the release of**
 - A. Thyroxin
 - B. Adrenaline
 - C. TSH (Thyroid stimulating hormone)
 - D. Acetylcholine

- 5. Sweating cools the body by**
 - A. Releasing hot water out of the body
 - B. Releasing extra water out of the body
 - C. Getting rid of salts
 - D. Evaporating

- 6. The temperature of the surrounding environment is first sensed by the**
 - A. Thyroid gland

- B. Hypothalamus
- C. Skin thermoreceptors
- D. Capillaries under the skin

7. Vasodilation helps in

- A. Warming the body
- B. Cooling the body
- C. Releasing sweat
- D. Gaining heat

8. In negative feedback

- A. A change is corrected by an opposite change
- B. A decrease in the level of a factor is corrected by a further decrease
- C. An increase in the level of a factor is corrected by a further increase
- D. A decrease in the level of a factor is corrected by the release of insulin

9. When sugar level increases in the blood it is

- A. Changed into fructose
- B. Polymerized
- C. Hydrolyzed
- D. Digested

10. Insulin functions in

- A. Breaking glycogen
- B. Stimulating the hydrolysis of glycogen
- C. Turning fat to glycogen
- D. Turning sugar to glycogen

11. Concerning temperature regulation mammals are considered

- A. Cold blooded
- B. Ectotherms
- C. Endotherms
- D. Exergonic

12. Loss of heat from the body by radiation occurs by

- A. Conduction

- B. Energy waves
- C. Convection currents
- D. Diffusion

13. TSH is released by the

- A. Hypothalamus
- B. Pituitary
- C. Brain
- D. Thyroid gland

14. TRH is released by the

- A. Hypothalamus
- B. Pituitary
- C. Brain
- D. Thyroid gland

15. Thyroxin

- A. Increases the rate of respiration
- B. Decreases the rate of respiration
- C. Increases the loss of heat
- D. Increases convection

16. When the capillaries under the skin constrict

- A. The shunt vessels dilate
- B. The shunt vessels constrict
- C. Heat loss increases
- D. Respiration decreases

17. In normal individuals, after a glucose rich meal.

- A. The release of glucagon increases
- B. The release of insulin increases
- C. The breakdown of glycogen increases
- D. Sugar appears in the urine

18. In hot weather

- A. The blood vessels directly under the skin constrict

- B. The shunt vessel constrict
- C. The shunt vessels dilate
- D. The blood vessels stay the same

19. The chief thermoregulatory center in the body is the

- A. Skin
- B. Hypothalamus
- C. Thyroid gland
- D. Pituitary gland

20. The thermostat of the body is located in the

- A. Medulla oblongata
- B. Brain stem
- C. Pituitary gland
- D. Hypothalamus

21. Conduction is the transfer of heat by

- A. Convection currents
- B. Movement of warm air upwards
- C. Movement of cold air upward
- D. Movement of heat between two objects that are in contact.

22. Increased thyroxine level

- A. Increases cellular respiration and the production of heat
- B. Decreases cellular respiration and the production of heat
- C. Increases reabsorption of salts from the nephron
- D. Decreases reabsorption of salts from the nephron

23. One of the functions of insulin is

- A. Stimulation of cell respiration
- B. Decrease in sugar absorption by cells
- C. Decrease in conversion of glucose to fat
- D. Increase in hydrolysis of glycogen

24. Increased glucagon secretion occurs after

- A. A sugar rich diet

- B. Exercise
- C. Resting
- D. Sweating

25. Insulin is a

- A. Protein
- B. Carbohydrate
- C. Nucleotide
- D. Lipid

26. Insulin is released from

- A. Liver cells
- B. Hepatic cells
- C. α cells of the pancreas
- D. β cells of the pancreas

27. Glucagon is released from

- A. Liver cells
- B. Hepatic cells
- C. α cells of the pancreas
- D. β cells of the pancreas

28. Heat is carried around the body by the

- A. Hypothalamus
- B. Pituitary
- C. Blood
- D. Antibodies

29. One of the signs of diabetes is frequent urination, this is due to

- A. Vasoconstriction
- B. Vasodilation
- C. Sweating
- D. Excretion of sugar

30. Insulin injection is given to people who have

- A. Low sugar level

- B. High sugar level
- C. Low thyroid activity
- D. Low hypothalamic activity

31. In hot surroundings the following responses occur in humans

- A. Vasodilation, sweating, hairs lay, metabolic rate decreases
- B. Vasodilation, sweating, hairs lay, metabolic rate increases
- C. Vasodilation, sweating, hairs rise, metabolic rate decreases
- D. Vasoconstriction, sweating, hairs lay, metabolic rate decreases

32. In cold surroundings the following responses occur in humans

- A. Vasodilation, no sweating, hairs lay, metabolic rate increases
- B. Vasodilation, sweating, hairs lay, metabolic rate increases
- C. Vasoconstriction, sweating, hairs rise, metabolic rate decreases
- D. Vasoconstriction, no sweating, hairs rise, metabolic rate increases

33. Vasoconstriction in response to cold surroundings, causes

- A. More blood to flow in the capillaries directly under the skin
- B. No change in the blood flow in the shunt vessels
- C. No change of blood flow in the capillaries directly under the skin
- D. Less blood to flow in the capillaries directly under the skin

34. One of the actions of glucagon is to

- A. Change glucose to amino acids
- B. Change amino acids to glucose
- C. Change glucose to glycogen
- D. Change glucose to fat

35. One of the actions of insulin is to

- A. Change glucose to amino acids
 - B. Change amino acids to glucose
 - C. Change glucose to glycogen
 - D. Change fat to glucose
-

Chapter 19

Excretion

- 1. Sodium is reabsorbed from the proximal tubule by**
 - A. Active transport
 - B. Diffusion
 - C. Facilitated diffusion
 - D. Pinocytosis

- 2. Bowman capsules are located in the**
 - A. Medulla
 - B. Cortex
 - C. Pelvis
 - D. Malpighian pyramids

- 3. The force that squeezes fluid out of the glomerulus into the Bowman capsule is**
 - A. Osmosis
 - B. Diffusion
 - C. Blood pressure
 - D. Atmospheric pressure

- 4. Most water is reabsorbed in the**
 - A. Bowman's capsule
 - B. Proximal convoluted tubule
 - C. Loop of Henle
 - D. Distal convoluted tubule

- 5. In the lower part of the ascending loop of Henle**
 - A. Water is reabsorbed by osmosis
 - B. Water is reabsorbed by active transport
 - C. Sodium chloride is reabsorbed by diffusion
 - D. Sodium chloride is reabsorbed by active transport

- 6. The molecules mostly reabsorbed in the descending loop of Henle are**
 - A. Water
 - B. Glucose

- C. Urea
- D. Proteins

7. The glomeruli are located in the

- A. Kidney envelop
- B. Cortex
- C. Medulla
- D. Pelvis

8. Urine drips into the pelvis from the

- A. Glomeruli
- B. Proximal convoluted tubule
- C. Distal convoluted tubule
- D. Collecting duct

9. ADH

- A. Increases the permeability of the collecting duct to salts
- B. Decreases the permeability of the collecting duct to salts
- C. Decreases the permeability of collecting duct to water
- D. Increases the permeability of the collecting duct to water

10. The highest rate of ADH secretion occurs

- A. After drinking a liter of water
- B. During exercise
- C. During low metabolic activity such as sleeping
- D. In cold weather

11. In terrestrial animals the kidney functions at releasing urine which is

- A. Less concentrated than body fluids
- B. The same concentration as body fluid
- C. More concentrated than body fluid
- D. Rich in carbon dioxide.

12. The structural and functional unit of the kidney is the

- A. Bowman's capsule
- B. Glomerulus

- C. Medulla
- D. Nephron

13. The percentage of urea is

- A. Higher in the proximal convoluted tubule than the distal tubule
- B. Higher in the distal convoluted tubule than the collecting duct.
- C. Lower in the distal convoluted tubule than the collecting duct
- D. Higher in the glomerulus than the distal convoluted tubule

14. The following structures can be found in the cortex of the kidney.

- A. Glomerulus, Bowman's capsule, loop of Henle, distal convoluted tubule
- B. Glomerulus, Bowman's capsule, distal convoluted tubule, collecting duct.
- C. Glomerulus, Bowman's capsule, proximal convoluted tubule, distal convoluted tubule.
- D. Loop of Henle, proximal convoluted tubule, distal convoluted tubules.

15. The following structures can be found in the medulla

- A. Glomerulus, Bowman's capsule, loop of Henle, distal convoluted tubules
- B. Glomerulus, Bowman's capsule, distal convoluted tubules, collecting duct.
- C. Glomerulus, Bowman's capsule, proximal convoluted tubules, distal convoluted tubules.
- D. Loops of Henle, collecting ducts.

16. In the distal convoluted tubule, the urine is usually

- A. Hypotonic
- B. Hypertonic
- C. Isotonic
- D. Concentrated

17. In the proximal convoluted tubule the following substances are reabsorbed

- A. Sugar only
- B. Proteins
- C. Water only
- D. Water and sugar

18. The tube connecting the kidney to the urinary bladder is the

- A. Urethra
- B. Ureter
- C. Tubule
- D. Pelvis

19. The blood vessel that goes into the Bowman capsule is the

- A. Afferent renal arteriole
- B. Efferent renal arteriole
- C. Afferent renal vein
- D. Efferent renal vein

20. Choose the correct statement

- A. The afferent renal arteriole has more glucose than the efferent renal arteriole
- B. The efferent renal arteriole has more glucose than the afferent renal arteriole
- C. The renal vein has more salts than the afferent renal arteriole
- D. The renal vein has more sugar than the afferent renal arteriole

21. ADH is released from the

- A. Hypothalamus
- B. Medulla
- C. Cortex
- D. Pituitary

22. Aldosterone

- A. Increases the permeability of the collecting duct to water
- B. Decreases the permeability of the collecting duct to water
- C. Increases the reabsorption of sodium from the collecting duct
- D. Decreases the reabsorption of sodium from the collecting duct

23. Aldosterone

- A. Increases the reabsorption of calcium ions
- B. Decreases the reabsorption of calcium ions
- C. Decreases the reabsorption of sodium
- D. Increases the reabsorption of sodium.

24. Urea is made in the

- A. Kidney
- B. Urinary bladder
- C. Liver
- D. Tubule

25. Freshwater animals release nitrogenous waste in the form of

- A. Urea
- B. Ammonia
- C. Uric acid
- D. Trimethylamine

26. Birds get rid of nitrogenous compounds in the form of

- A. Urea
- B. Ammonia
- C. Uric acid
- D. Trimethylamine

27. Choose the correct statement

- A. Urea is more water soluble than ammonia
- B. Ammonia is more water soluble than urea
- C. Urea is removed by tadpoles
- D. Ammonia is removed by marine fish

28. The correct sequence of tubules in the nephron is

- A. Distal, proximal, loop of Henle, collecting duct
- B. Proximal, loop of Henle, distal, collecting duct
- C. Loop of Henle, proximal, distal, collecting duct
- D. Collecting duct, distal, proximal, loop of Henle

29. Choose the correct answer about the function and state of solution in the different parts of the nephron

	Nephron section	State of solution	Substance reabsorbed
A	Proximal convoluted tubule	Hypertonic	♦ sodium chloride by active transport ♦ Followed by water by osmosis. About 70% of the water is reabsorbed in this part ♦ All the glucose by active transport
B	Descending part of loop of Henle	Hypotonic	♦ sodium chloride by active transport
C	Ascending part of loop of Henle	Hypertonic	♦ In the lower section, salts by diffusion ♦ In the upper section, salts by active transport
D	Distal convoluted tubule	Hypotonic	Sugar by active transport

30. In the upper part of the ascending loop of Henle, molecules move

- A. With the gradient
- B. Against the gradient
- C. Without the need for energy
- D. With the need for salts

31. The molecules in the initial filtrate pass out of the glomerulus according to their

- A. Need by the body
- B. Concentration gradient
- C. Energy
- D. Size

32. The reabsorption of sodium is stimulated by the action of

- A. ADH
- B. Adrenaline
- C. Aldosterone
- D. Acetylcholine

33. The reabsorption of proteins occurs mostly in the

- A. Proximal convoluted tubule
- B. Distal convoluted tubule
- C. Collecting duct
- D. Non of the above

34. The reabsorbed water passes from the tubules into the

- A. Renal artery
- B. Hepatic artery
- C. Peritubular capillaries
- D. Afferent renal arteriole

35. The nitrogenous waste in humans is mainly

- A. Sodium chloride
- B. Ammonia
- C. Amino acids
- D. Urea

36. Water is reabsorbed from the distal convoluted tubule by

- A. Active transport
- B. Facilitated diffusion
- C. Osmosis
- D. Pinocytosis

37. Sodium is reabsorbed from the proximal convoluted tubule by

- A. Active transport
- B. Facilitated diffusion
- C. Osmosis
- D. Pinocytosis

38. Water is reabsorbed from the loop of Henle by

- A. Active transport
- B. Facilitated diffusion
- C. Osmosis
- D. Pinocytosis

39. Water is reabsorbed from the collecting duct by

- A. Active transport
- B. Facilitated diffusion
- C. Osmosis
- D. Pinocytosis

40. The highest number of mitochondria is present in the cells of the

- A. Proximal convoluted tubule
- B. Distal convoluted tubule
- C. Loop of Henle
- D. Collecting duct

41. The medulla of the kidney does not contain

- A. Loops of Henle
- B. Collecting ducts
- C. Blood vessels
- D. Glomeruli

42. The distal convoluted tubules are present in the

- A. Pelvis
- B. Kidney envelop
- C. Cortex
- D. Medulla

43. The renal artery is a branch of the

- A. Hepatic artery
- B. Aorta
- C. Vena cava
- D. Pulmonary artery

44. The renal vein merges into

- A. Hepatic artery
- B. Aorta
- C. Vena cava
- D. Pulmonary artery

45. The highest concentration of urea can be found in the

- A. Renal artery
- B. Renal vein
- C. Efferent renal arteriole
- D. Peritubular capillaries

46. The filtrate squeezes out of the

- A. Glomerulus
- B. Nephron
- C. Distal convoluted tubule
- D. Proximal convoluted tubule

47. The filtrate starts its journey in the

- A. Bowman capsule
- B. Proximal convoluted tubule
- C. Distal convoluted tubule
- D. Collecting duct

48. Substances that are not reabsorbed in the nephron end up in the

- A. Bowman capsule
- B. Proximal convoluted tubule
- C. Distal convoluted tubule
- D. Pelvis

49. The tube leading from the urinary bladder to the outside of the body is the

- A. Ureter
- B. Urinary bladder
- C. Urethra
- D. Collecting duct

50. The kidney is composed of microscopic units called

- A. Nephrons
 - B. Glomeruli
 - C. Bowman capsules
 - D. Loops of Henle
-

Chapter 20

Human Reproduction

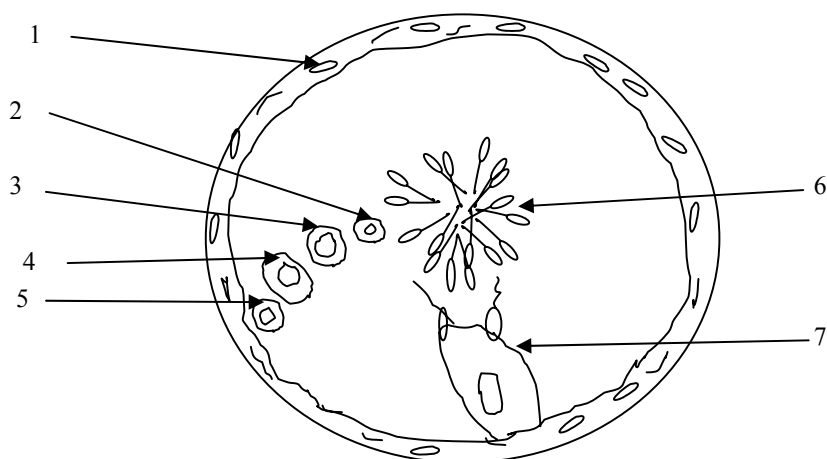
- 1. The thin folded tubes inside each testis are called**
 - A. Vas deferens
 - B. Epididymis
 - C. Seminiferous tubules
 - D. Seminal vesicles

- 2. The sperms travel out of the testis towards the urethra, in the**
 - A. Vas deferens
 - B. Epididymis
 - C. Seminiferous tubules
 - D. Seminal vesicles

- 3. The Seminiferous tubules merge into the**
 - A. Vas deferens
 - B. Epididymis
 - C. Seminiferous tubules
 - D. Seminal vesicles

- 4. Spermatogenesis occurs in the**
 - A. Vas deferens
 - B. Epididymis
 - C. Seminiferous tubules
 - D. Seminal vesicles

- 5. Estrogen is secreted by the**
 - A. Hypothalamus
 - B. The follicle
 - C. Pituitary
 - D. Egg



The above diagram shows a transverse section of the seminiferous tubule of the testis. Study the diagram, then answer questions 6 – 8

6. What are the arrows pointing at

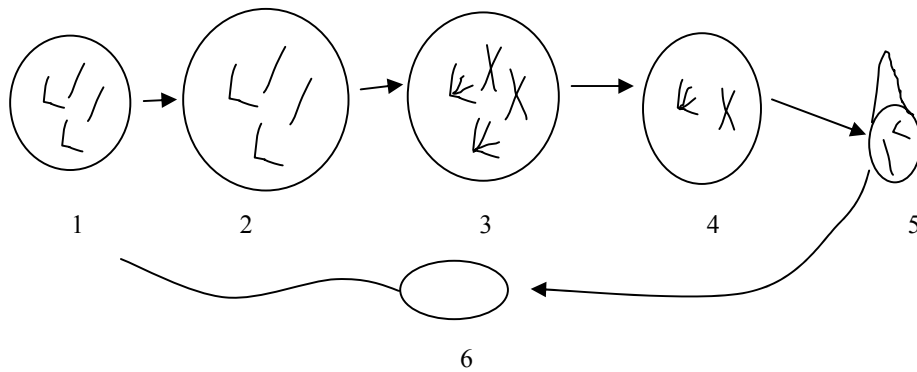
	1	2	3	4	5
A	Secondary spermatocyte	Primordial germ cell	Primary spermatocyte	Spermatid	Spermatogonia
B	Primordial germ cell	Spermatid	Secondary spermatocyte	Primary spermatocyte	Spermatogonia
C	Primordial germ cell	Spermatid	Primary spermatocyte	Secondary spermatocyte	Spermatogonia
D	Primordial germ cell	Spermatid	Secondary spermatocyte	Spermatogonia	Primary spermatocyte

7. What is the n number of chromosomes in each of the following cells

	1	2	3	4	5
A	2n	n	2n	2n	2n
B	2n	n	n	n	2n
C	2n	n	n	2n	2n
D	n	n	n	n	2n

8. What is the function of cell 7

- A. Feeding
- B. Excretion
- C. Fertilization
- D. Meiosis



The above diagrams illustrate cells in the process of spermatogenesis in the male testis

9. What are the stages represented by each cell

	1	2	3	4	5	6
A	Primordial germ cell	Spermatogonia	Primary spermatocyte	Secondary spermatocyte	Spermatid	Sperm
B	Primordial germ cell	Spermatogonia	Secondary spermatocyte	Primary spermatocyte	Spermatid	Sperm
C	Spermatogonia	Primordial germ cell	Primary spermatocyte	Secondary spermatocyte	Spermatid	Sperm
D	Primordial germ cell	Spermatogonia	Primary spermatocyte	Secondary spermatocyte	Sperm	Spermatid

10. The end result of the first meiotic division is cell

- A. 3
- B. 4
- C. 5
- D. 6

11. The second meiotic division occurs between cells

- A. 2 and 3
- B. 3 and 4
- B. 4 and 5
- A. 5 and 6

12. When LH is high in the blood of a male, it exerts a

- A. Positive feed back on the pituitary and the hypothalamus and so more testosterone is secreted by the testes

- B. Negative feedback on the pituitary and the hypothalamus and so less testosterone is secreted by the testes
- C. Positive feed back on the pituitary and the hypothalamus and so more testosterone is released by the pituitary
- D. Negative feedback on the pituitary and the hypothalamus and so less testosterone is secreted by the pituitary

13. FSH in the male is released by the

- A. Hypothalamus
- B. Testis
- C. Pituitary gland
- D. Sartoli cells

14. LH is secreted by

- A. Hypothalamus
- B. Testis
- C. Pituitary gland
- D. Sartoli cells

15. Inhibin is a hormone released by

- A. Hypothalamus
- B. Testis
- C. Pituitary gland
- D. Sartoli cells

16. High level of inhibin exerts a

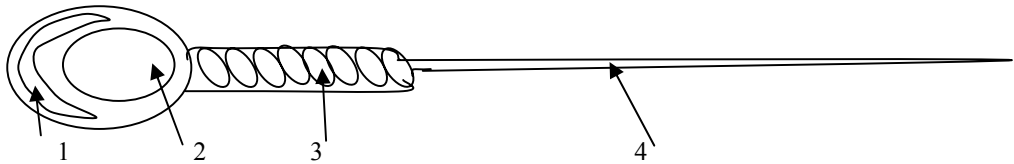
- A. Positive feed back on the pituitary and the hypothalamus and so more FSH is secreted
- B. Negative feedback on the pituitary and the hypothalamus and so less FSH is secreted
- C. Positive feed back on the pituitary and the hypothalamus and so more testosterone is released by the pituitary
- D. Negative feedback on the pituitary and the hypothalamus and so less testosterone is secreted by the pituitary

17. Testosterone and FSH are both needed for

- A. Inhibin production
- B. GnRH production
- C. Spermatogenesis
- D. Oogenesis

18. The secondary sexual characteristics are mainly controlled by

- A. Inhibin
- B. LH
- C. FSH
- D. Testosterone

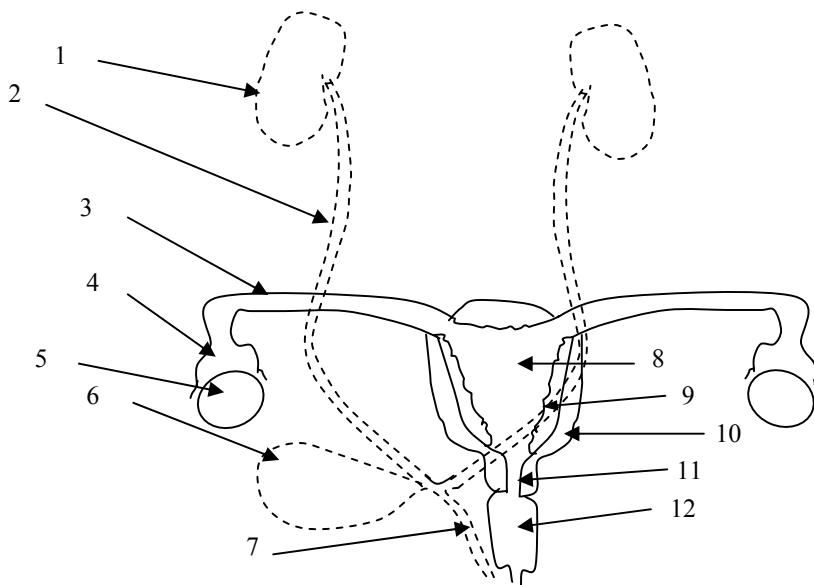


19. In the above diagram, what are 1,2,3,and 4 respectively

	1	2	3	4
A	Mitochondria	Nucleus	Acrosome	Flagellum
B	Acrosome	Nucleus	Mitochondria	Tail
C	Acrosome	Mitochondria	Nucleus	Flagellum
D	Mitochondria	Acrosome	Nucleus	Tail

20. The function of structure 1 is to

- A. Digest the egg coat
- B. Produce energy
- C. Control characteristics
- D. Help in movement of the sperm



Study the above diagram, then answer questions 21 – 23

21. What is the function of each of the structures shown below

	1	2	3	4
A	Passing urine	Filtration	Egg transport	Ovulation
B	Filtration	Reabsorption	Release of egg	Egg production
C	Reabsorption	Filtration	Passage of eggs	Egg production
D	Reabsorption	Passage of urine	Passage of egg	Receiving the egg

22. What is the function of each of the structures shown below

	5	6	7	8
A	Growth of fetus	Egg production	Urine passage	Urine storage
B	Oogenesis	Making urine	Growth of fetus	Growth of zygote
C	Oogenesis	Growth of fetus	Passage of egg	Growth of egg
D	Egg production	Urine storage	Urine passage	Growth of fetus

23. What is the function of each of the structures shown below

	9	10	11	12
A	Implantation	Support the baby	Controlling the opening	Intercourse
B	Growth of egg	Contraction	Intercourse	Receiving sperms
C	Implantation	Labor	Passage of urine	Passage of egg
D	Contraction	Delivery	Implantation	Passage of urine

24. FSH is released from the

- A. Hypothalamus
- B. Pituitary
- C. Ovaries
- D. Follicle

25. LH is released from the

- A. Hypothalamus
- B. Pituitary
- C. Ovaries
- D. Follicle

26. Estrogen is released from the

- A. Hypothalamus
- B. Pituitary

- C. Egg
- D. Follicle

27. Progesterone is released from the

- A. Hypothalamus
- B. Pituitary
- C. Ovaries
- D. Corpus luteum

28. Which hormone causes the maturation of the egg and its follicle?

- A. FSH
- B. LH
- C. Estrogen
- D. Progesterone

29. Which hormone causes the maturation of the follicle into a corpus luteum?

- A. FSH
- B. LH
- C. Estrogen
- D. Progesterone

30. Which hormone repairs the broken endometrium?

- A. FSH
- B. LH
- C. Estrogen
- D. Thyroxin

31. Which hormone maintains the thickening of the endometrium during pregnancy?

- A. FSH
- B. LH
- C. Estrogen
- D. Progesterone

32. The follicle grows in the

- A. First two weeks of the cycle
- B. Second two weeks of the cycle
- C. The middle of the cycle

D. The last day of cycle

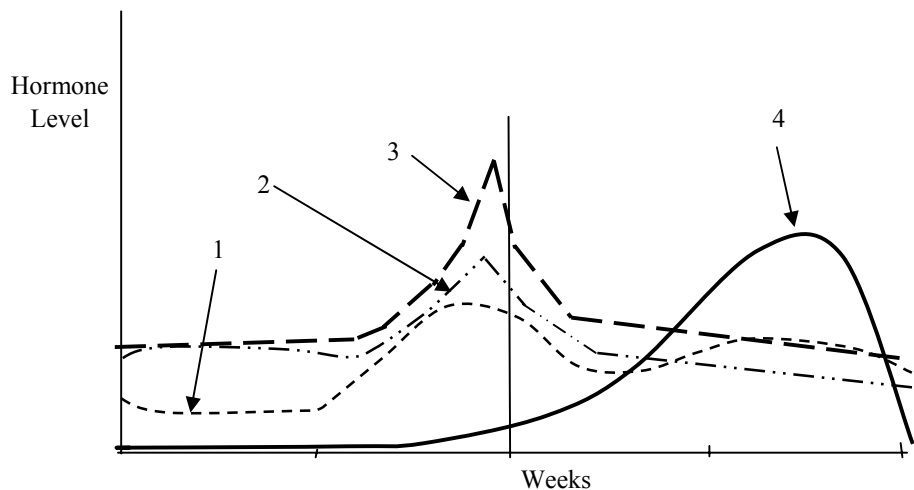
33. The corpus luteum grows in the

- A. First week of the cycle
- B. Second week of the cycle
- C. Third week of the cycle
- D. The last day of cycle

34. The egg is usually released in the

- A. First day of the cycle
- B. First week of the cycle
- C. Middle of the cycle
- D. End of the cycle

Study the following diagram, then answer question 35



35. What are the hormones at the numbered arrows

	1	2	3	4
A	Progesterone	FSH	LH	Estrogen
B	Estrogen	LH	FSH	Progesterone
C	Estrogen	FSH	Progesterone	LH
D	Estrogen	FSH	LH	Progesterone

36. In humans spermatogonia are

- A. Diploid
- B. Haploid
- C. Contain only the Y chromosome

- D. Contain 44 chromosomes

37. One of the following is haploid

- A. Primary spermatocyte
- B. Secondary spermatocyte
- C. Primary oocyte
- D. Sertoli cell

38. The function of the Sertoli cell is to

- A. Produce the primary spermatocyte
- B. Produce the spermatogonia
- C. Feed the spermatogonia
- D. Feed the spermatids

39. Sterilization by vasectomy involves cutting the

- A. Vas deferens
- B. Urethra
- C. Epididymis
- D. Seminal vesicles

40. An unfertilized oocyte lives for

- A. 24 hours
- B. 36 hours
- C. 48 hours
- D. 72 hours

41. Sterilization in the female involves tying the

- A. Ovaries
- B. Uterus
- C. Oviducts
- D. Vagina

42. The endometrium re-grows after menstruation due to the effect of

- A. Estrogen
- B. Progesterone
- C. LH

D. FSH

43. The corpus luteum mainly secretes

- A. LH
- B. FSH
- C. Estrogen
- D. Progesterone

44. The egg released in ovulation is a

- A. Primary oocyte
- B. Secondary oocyte
- C. First polar body
- D. Second polar body

45. The number of different gametes that can be produced by a human female is approximately

- A. 1
- B. 4
- C. 6 million
- D. 8 million

46. Testosterone is released by the

- A. Hypothalamus
- B. Pituitary
- C. Sperms
- D. Interstitial cells

47. The ureter is a passage for

- A. Urine
- B. Sperms
- C. Urine and sperms
- D. Alkaline solution

48. Choose the correct combination of hormones and the glands that secrete them

	Pituitary	Ovary	Pituitary	Ovary
A	LH	FSH	Estrogen	Progesterone
B	Estrogen	FSH	LH	Progesterone
C	LH	FSH	Progesterone	Estrogen
D	LH	Estrogen	FSH	Progesterone

49. Ovulation usually occurs in the

- A. Start of the menstrual cycle
- B. Middle of the menstrual cycle
- C. End of the menstrual cycle
- D. Any time during the menstrual cycle

50. GnRH is released by the

- A. Hypothalamus
- B. Pituitary
- C. Ovary
- D. Testis

51. In amniocentesis cells are drawn from the

- A. Chorion
- B. Amniotic fluid
- C. Placenta
- D. Umbilical cord

52. For karyotyping the chromosomes are viewed during

- A. Prophase
- B. Anaphase
- C. Metaphase
- D. Telophase

53. Karyotyping can reveal genetic abnormalities such as

- A. Albinism
- B. Sickle cell anaemia

- C. Haemophilia
- D. Down's syndrome

54. Oogonia are

- A. Haploid
- B. Diploid
- C. Mature eggs
- D. Cells with 23 chromosomes

55. Secondary oocytes are

- A. Haploid
- B. Diploid
- C. Cells with two X chromosomes
- D. Similar to oogonia in chromosomal number

56. Primary oocytes are

- A. Haploid
- B. Diploid
- C. Released in menstruation
- D. Produced before oogonia

57. Polar bodies are

- A. Haploid
- B. Diploid
- C. Produced before primary oocytes
- D. Produced before oogonia

58. The maximum number of polar bodies that can be produced from the division of one oocyte is

- A. 1
- B. 2
- C. 3
- D. 4

59. The second meiotic division takes place

- A. Before entry of sperm nucleus
- B. After entry of sperm nucleus
- C. After menstruation
- D. During menstruation

60. The first meiotic division produces

- A. Oogonia
- B. Primary oocytes
- C. Secondary oocytes
- D. Egg

61. The second meiotic division occurs in the

- A. Ovary
- B. Oviduct
- C. Uterus
- D. Endometrium

62. At birth a female ovary has about a million of

- A. primary oocytes
- B. Secondary oocyte
- C. Mature eggs
- D. Polar bodies

63. The primary oocyte is at

- A. Interphase
- B. Prophase
- C. Metaphase
- D. Telophase

64. Meiosis resumes in the primary oocyte after

- A. Sexual maturation
- B. Sexual intercourse
- C. High progesterone
- D. Age of 45

65. A normal male produces the following number of sperms in each ejaculate

- A. 2 million
- B. 2000 million
- C. 9 million
- D. 900 million

66. Usually the female produces the following number of eggs in each cycle

- A. 1
- B. 2
- C. 3
- D. 4

67. Menopause is when the

- A. Female produces eggs
- B. Female stops producing eggs
- C. Male produces sperms
- D. Male stops producing sperms

68. The zona pellucida is a layer surrounding the egg for protection, it is made of

- A. Follicular cells
- B. Proteins and polysaccharides (jelly coat)
- C. Membrane with species specific proteins
- D. Phospholipid bilayer

69. A small nucleus can be seen inside a secondary oocyte, this is the

- A. Primary oocyte
- B. First polar body
- C. Second polar body
- D. Third polar body

70. In fertilization, the stages occur in the following sequence

- A. Acrosome reaction, cortical reaction, activation of the egg, fusion of egg and sperm nuclei
- B. Cortical reaction, acrosome reaction, activation of the egg, fusion of egg and sperm nuclei
- C. Activation of the egg, cortical reaction, acrosome reaction, fusion of egg and sperm nuclei
- D. Cortical reaction, acrosome reaction, fusion of egg and sperm nuclei, Activation of the egg

In the cortical reaction some stages take place in a certain sequence

1. The egg cell membrane becomes depolarized
2. Molecules from the sperm bind with receptors on the vitelline envelope of the egg
3. In the egg, calcium ions are released from the endoplasmic reticulum to the cytoplasm
4. Sodium ions enter the egg cytoplasm and reverse the membrane polarization
5. Lifting of the fertilization membrane
6. Exocytosis of cortical vesicles

71. What is the correct sequence of these stages

- A. 1, 2, 3, 4, 5, 6
- B. 2, 3, 1, 4, 5, 6
- C. 2, 1, 4, 3, 6, 5
- D. 2, 1, 3, 4, 6, 5

72. In the acrosome reaction, enzymes burst out of the acrosome and digest the

- A. Vitelline envelope
- B. Jelly coat
- C. Cell membrane
- D. Nuclear envelope

73. The species specific receptors are located on the

- A. Sperm cell membrane
- B. Egg cell membrane
- C. Jelly coat
- D. Vitelline envelope

74. The egg cell membrane becomes reversely polarized by the

- A. Entry of sodium ions into the egg
- B. Exiting of sodium ions into the egg
- C. Entry of calcium ions into the egg
- D. Exiting of calcium ions into the egg

75. Exocytosis of the cortical vesicles occurs due to

- A. The release of calcium ions from the cytoplasm into the endoplasmic reticulum
- B. The release of calcium ions from the endoplasmic reticulum into the cytoplasm
- C. The release of sodium ions from the cytoplasm into the endoplasmic reticulum
- D. The release of sodium ions from the endoplasmic reticulum into the cytoplasm

76. Lifting of the fertilization membrane occurs due to the

- A. Activation of the nucleus
- B. Bursting of the cortical vesicle
- C. Digestion of the jelly coat
- D. Building of a calcium wall around the cell

77. The cortical vesicles release

- A. Fat
- B. Nucleotides
- C. Polysaccharides
- D. Oils

78. Fertilization usually occurs in the

- A. Uterus
- B. Endometrium
- C. Fallopian funnel
- D. Oviduct

79. The zygote starts dividing in the

- A. Uterus
- B. Endometrium
- C. Fallopian funnel
- D. Oviduct

80. The blastocoel is a

- A. Stage in the embryonic development
- B. The structure that implants in the endometrium
- C. A cavity in the blastocyst
- D. A ball of cells

81. The amount of time spent between fertilization and implantation is about

- A. 24 hours
- B. 72 hours
- C. 6 days
- D. 14 days

82. The part of the blastocyst that makes contact with the endometrium for implantation is the

- A. Trophoblast
- B. Morula
- C. Vitelline envelope
- D. Amnion

83. The hormone that stimulates the corpus luteum to persist after implantation is

- A. Oxytocin
- B. Estrogen
- C. Progesterone
- D. HCG

84. In the first few weeks after implantation, the growing embryo absorbs its food from the

- A. Amniotic fluid
- B. Endometrium
- C. Placenta
- D. Chorion

85. HCG is released by the

- A. Uterus
- B. Placenta
- C. Endometrium
- D. Trophoblast

86. The earliest change in hormone level that can be tested for detecting pregnancy is

- A. Oxytocin
- B. Estrogen
- C. Progesterone
- D. HCG

87. The IUD (intrauterine device), used as a birth control method prevents

- A. Ovulation
- B. Release of estrogen
- C. Release of progesterone
- D. Implantation

88. In amniocentesis cells from the

- A. Mother are tested for abnormalities

- B. Fetus are tested for abnormalities
- C. The correct genes are injected into the amniotic fluid
- D. The correct genes are injected into the fetus

89. In CVS, a small piece of tissue is removed from the

- A. Uterus
- B. Placenta
- C. Chorion
- D. Amniotic sac

90. Which of the following statements is incorrect. In invitro fertilization,

- A. The baby is grown for a few months in a test tube
- B. Some genetic diseases can be avoided
- C. The sex of the baby can be controlled
- D. More than one embryo can be grown

91. Identical twins result when the

- A. Zygote divides into two cells that separate
- B. Mother produces two eggs
- C. Egg is fertilized by two sperms
- D. Egg has two nuclei

92. Identical twins could be

- A. A boy and a girl
- B. Two exactly identical girls
- C. Two different boys
- D. Two different girls

93. Transmission of HIV can be avoided by using

- A. Contraceptive pills
- B. Intrauterine device (IUD)
- C. Male condom
- D. All of the above

94. As a contraceptive, the pill prevents

- A. Ovulation
- B. Menstruation

- C. Fertilization
- D. Implantation

95. During pregnancy, a mucous plug guards the opening of the

- A. Fallopian tube
- B. Oviduct
- C. Cervix
- D. Vagina

96. During the menstrual cycle, the endometrium grows in preparation for

- A. Ovulation
- B. Fertilization
- C. Implantation
- D. Ejaculation

97. The increase in the level of the hormone oxytocin

- A. Increases ovulation
- B. Increases contractions of the uterine wall
- C. Prevents contractions of the uterine wall
- D. Stimulates gestation

98. Gestation is the period of

- A. Fertilization
- B. Maturation of the egg
- C. Pregnancy
- D. Ovulation

99. During the menstrual cycle, the corpus luteum develops

- A. After ovulation
- B. Before ovulation
- C. After fertilization
- D. After implantation

100. Spermatids are

- A. Haploid
 - B. Diploid
 - C. Deformed sperms
 - D. Immature spermatogonia
-

Chapter 21

Ecology

1. A habitat is

- A. All the factors needed for one population to survive
- B. The place where organisms live
- C. The total abiotic factors of the environment
- D. The niche of one species

2. A population is

- A. The number of people in the world
- B. A group of organisms living in the same ecosystem
- C. A group of organisms belonging to the same species living in the same area
- D. A community

3. Humans living in Denmark are described as one

- A. Ecosystem
- B. Population
- C. Community
- D. Family

4. A species is

- A. A group of individuals
- B. A group of interbreeding organisms
- C. A group of different organisms
- D. An isolated group of organisms

5. A species has

- A. The same populations
- B. Different populations
- C. Different communities
- D. Different families

6. A community contains

- A. One species
- B. Many species
- C. Many species and their habitat
- D. One type of species living in the same ecosystem

7. A community inhabits the

- A. Same niche
- B. Same ecosystem
- C. Top of a food chain
- D. Bottom of a food chain

8. During the transition phase of the population growth

- A. The population does not increase
- B. There is faster growth in population
- C. There is lower growth in population
- D. The population starts decreasing

9. Competition for resources is most prominent in the following phase of population growth

- A. The early slow phase
- B. The exponential phase
- C. The transition phase
- D. The plateau phase

10. Energy cannot be recycled in an ecosystem because it

- A. Cannot be passed between organisms
- B. Is completely lost between trophic levels
- C. Changes to water
- D. Changes to heat

11. One of the ways of energy loss between trophic levels is

- A. Photosynthesis
- B. Respiration
- C. Transpiration
- D. Osmosis

12. In respiration

- A. Organic compounds are changed into inorganic
- B. Inorganic compounds are changed into organic
- C. Water is split into oxygen and hydrogen
- D. Energy is used to fix carbon dioxide

13. In photosynthesis

- A. Organic compounds are changed into inorganic
- B. Inorganic compounds are changed into organic
- C. Oxygen and hydrogen combine to form water
- D. Energy is lost in the form of oxygen

14. In estimation of population size by the capture-release recapture method, we expect the population to be bigger if the

- A. Number captured in the first catch is large
- B. Number captured in the second catch is large
- C. Marked individuals in the second catch is small
- D. Marked individuals in the second catch is big

15. Carbon dioxide accumulation in the atmosphere can cause

- A. Cancer
- B. Greener planet
- C. Warmer atmosphere
- D. Increased soil fertility

16. The part of the earth that contains life is called

- A. Habitat
- B. Biome
- C. Biosphere
- D. Atmosphere

17. All detritivores are

- A. Autotrophs
- B. Heterotrophs
- C. Producers
- D. Invertebrates

18. Detritivores feed on

- A. Remains of killed animals
- B. Plants
- C. Spoiled milk
- D. Feces

19. Fungi are

- A. Autotrophs
- B. Saprotrophs
- C. Detritivores
- D. Photosynthesizers

20. For an ecosystem to persist, the least trophic levels that must exist are

- A. Autotrophs and producers
- B. Autotrophs and consumers
- C. Consumers and decomposers
- D. Producers and decomposers

21. In the light dependent reaction

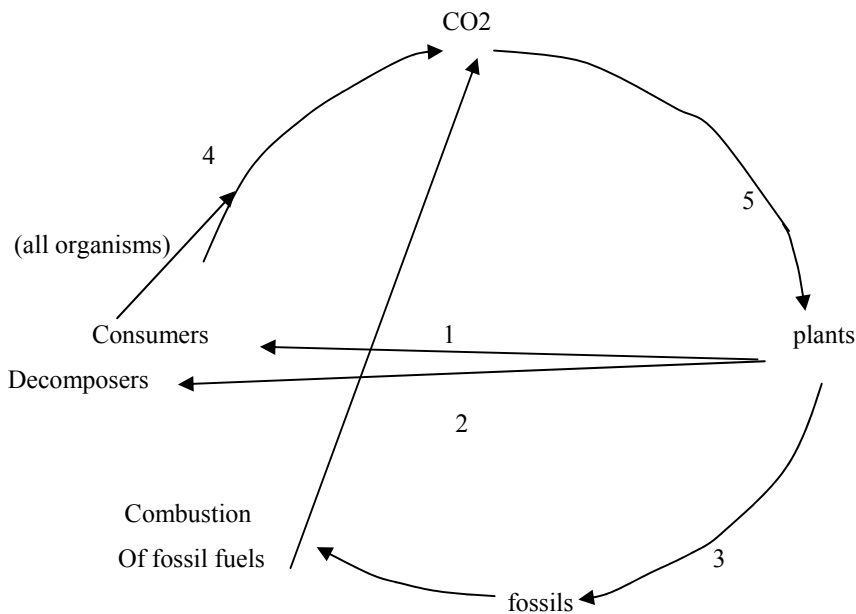
- A. Electrons flow from chlorophyll
- B. Oxygen reacts with hydrogen
- C. ATP is changed into ADP
- D. Carbon dioxide is fixed into glucose

22. Carbon dioxide is fixed into glucose

- A. In the light dependent reaction
- B. In the light independent reaction
- C. Only during the night
- D. In dim light only

23. For the light independent reaction the following substances are needed

- A. Carbon dioxide, ATP and hydrogen
- B. Oxygen, ATP and hydrogen
- C. Carbon dioxide, ADP and hydrogen
- D. Carbon dioxide, ATP and chlorophyll



24. In the carbon cycle above, which of the following correctly labels the numbers shown in the diagram

	1	2	3	4	5
A	Feeding	Decomposition	Deforestation	Respiration	Photosynthesis
B	Photosynthesis	Decomposition	Fossilization	Respiration	Feeding
C	Feeding	Decomposition	Fossilization	Respiration	Photosynthesis
D	Feeding	Transpiration	Fossilization	Respiration	Photosynthesis

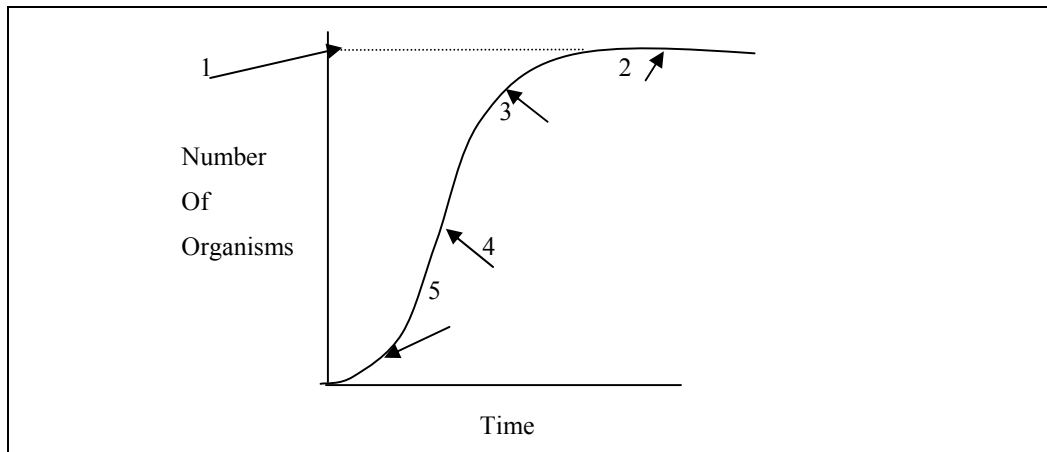
25. The loss of energy between the trophic levels of a community is due to

- A. Smaller organisms in higher levels of the pyramid
- B. Bigger organisms in higher levels of the pyramid
- C. Respiration
- D. Photosynthesis

26. The increase in the population of a certain species can be calculated using the formula:

- A. $(\text{Natality} + \text{immigration}) - (\text{mortality} + \text{emigration})$.
- B. $(\text{Natality} + \text{emigration}) - (\text{mortality} + \text{immigration})$.
- C. $(\text{Natality} + \text{mortality}) - (\text{immigration} + \text{emigration})$.
- D. $(\text{Natality} - \text{immigration}) + (\text{mortality} - \text{emigration})$.

Study the population growth below, then answer questions 27-31



27. What are the correct phases shown by the numbered arrows?

	2	3	4	5
A	Plateau phase	Slow phase	Exponential phase	Transitional phase
B	Plateau phase	Transitional phase	Exponential phase	Slow phase
C	Plateau phase	Exponential phase	Transitional phase	Slow phase
D	Slow phase	Transitional phase	Exponential phase	Plateau phase

28. What is arrow 1 pointing at

- A. Optimum temperature
- B. Maximum light intensity
- C. Carrying capacity
- D. Optimum temperature

29. In which part of the graph does (Natality + immigration) - (mortality + emigration), have the biggest value

- A. 2
- B. 3
- C. 4
- D. 5

30. In which part of the graph does (Natality + immigration) - (mortality + emigration), have a value of zero

- A. 2
- B. 3
- C. 4
- D. 5

31. In which part of the graph is competition between individuals at its highest level

- A. 2
- B. 3
- C. 4
- D. 5

32. Choose the correct statement

- A. An ecosystem with a single food chain is more stable than one with a food web
- B. An ecosystem with a food web is more stable than one with a single food chain
- C. Stability of an ecosystem depends on the activity of consumers
- D. Stability of an ecosystem depends on selective breeding

33. A grass hopper feeding on leaves of corn is considered as

- A. Primary consumer
- B. Secondary consumer
- C. Producer
- D. Detritovore

34. Chemosynthesizers are considered

- A. Primary consumers
- B. Detritovores
- C. Producers
- D. Decomposers

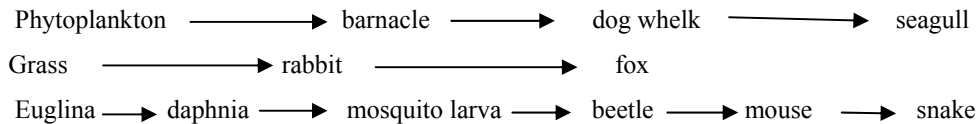
35. Ecology can be defined as the

- A. Scientific study of the interaction between organisms and their environment.
- B. Conservation of nature
- C. Conservation of species
- D. Prevention of extinction

36. An ecosystem is

- A. All the organisms in an environment
- B. Natural unit composed of interacting biotic and abiotic factors.
- C. Unit composed of interacting organisms
- D. The physical non-living factors

37. The following diagram shows

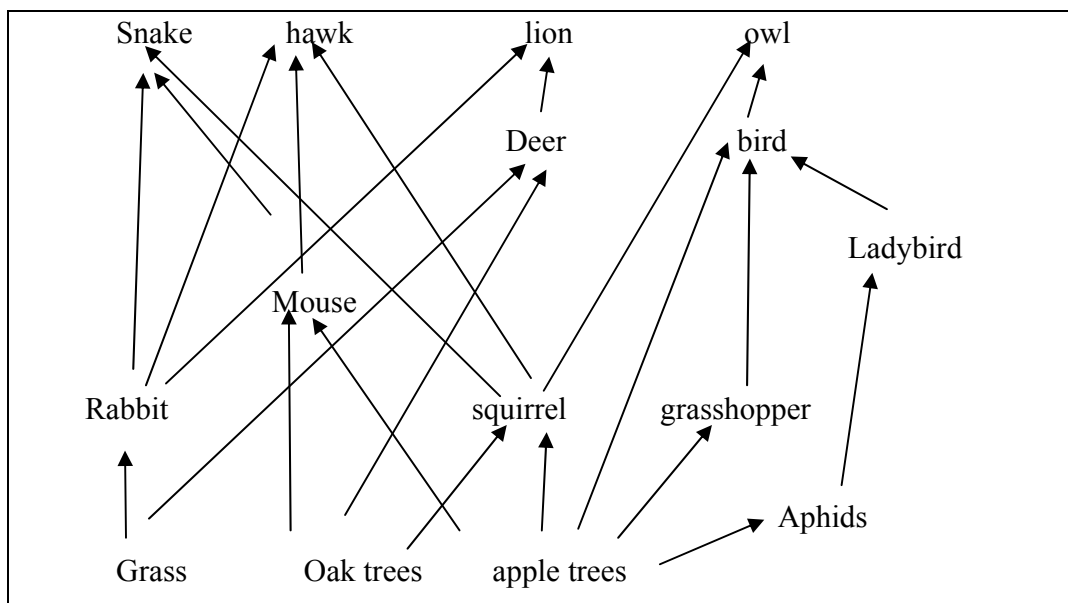


- A. A food web
- B. Food chains
- C. Ecosystem
- D. Population

38. Autotrophs are

- A. Decomposers
- B. Primary consumers
- C. Producers
- D. Parasites

Study the following food web then answer the questions 39 & 40



39. The deer is considered a

- A. Producer
- B. Primary consumer
- C. Secondary consumer
- D. Carnivore

40. The hawk is a

- A. Decomposer
- B. Primary consumer
- C. Secondary consumer
- D. Tertiary consumer

41. Humans are

- A. Autotrophs
- B. Heterotrophs
- C. Chemosynthesizers
- D. Primary producers

42. Saprotrophs are

- A. Autotrophs
- B. Heterotrophs
- C. Chemosynthesizers
- D. Primary producers

43. Fungi are

- A. Autotrophs
- B. Chemosynthesizers
- C. Primary producers
- D. Heterotrophs

44. Fungi can be

- A. Autotrophs
- B. Parasites
- C. Chemosynthesizers
- D. Producers

45. Nitrogen

- A. Recycles in ecosystems
- B. Does not recycle because it is lost to the atmosphere
- C. Does not recycle because it is washed away into rivers
- D. Is fixed by plants

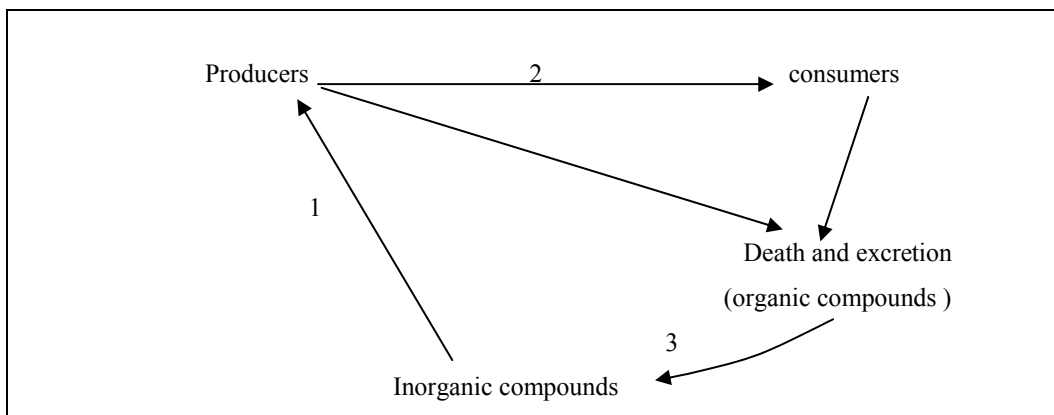
46. The main producers on this planet are the

- A. Photosynthesizers
- B. Chemosynthesizers
- C. Saprotrophs
- D. Fungi

47. In photosynthesis, green plants mostly absorb the following colors of light

- A. Red, blue and orange
- B. Red, green and violet
- C. Orange, blue and violet
- D. Red, blue and violet

Study the following diagram then answer questions 48- 50



48. Arrow 1 represents

- A. Decomposition
- B. Photosynthesis
- C. Excretion
- D. Nitrification

49. Arrow 2 represents

- A. Decomposition

- B. Hydrolysis
- C. Excretion
- D. Feeding

50. Arrow 3 represents

- A. Decomposition
- B. Photosynthesis
- C. Excretion
- D. Autotrophy

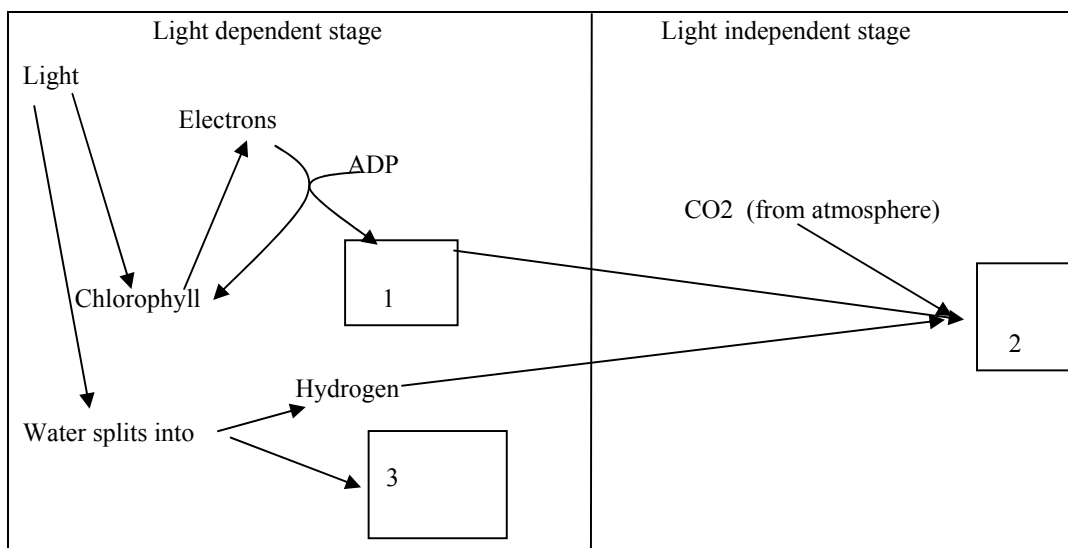
51. Photosynthesis takes place in the

- A. Mitochondria
- B. Ribosomes
- C. Cytoplasm
- D. Chloroplasts

52. In the light dependent stage, light is used to split

- A. Water into oxygen and hydrogen
- B. Carbon dioxide into carbon and oxygen
- C. Carbon dioxide into sugar
- D. Starch into glucose

Study the diagram below which shows a summary of the two stages involved in photosynthesis, then answer questions 53 - 55



53. Box 1 represents

- A. NAD
- B. NADP
- C. ATP
- D. Water

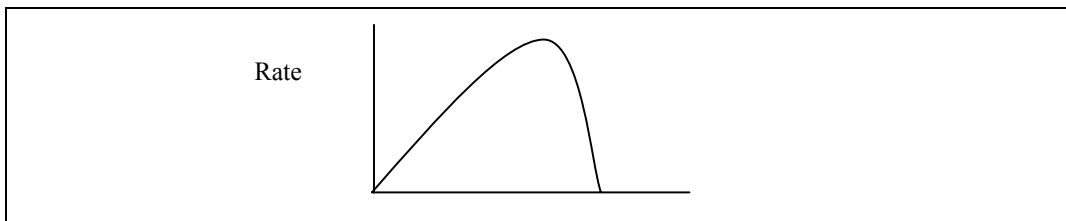
54. Box 2 represents

- A. Oxygen
- B. Hydrogen
- C. Water
- D. Sugar

55. Box 3 represents

- A. Oxygen
- B. Hydrogen
- C. Water
- D. Sugar

56. What factor is affecting the rate of photosynthesis in the diagram below?

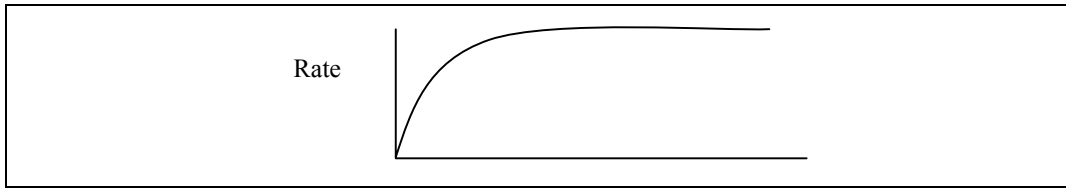


- A. Light
- B. Temperature
- C. Wind
- D. Carbon dioxide

57. Respiration occurs in

- A. Humans and animals
- B. Plants and bacteria
- C. Decomposers
- D. All of the above

58. What factor is affecting the rate of photosynthesis in the diagram below?



- A. Light
- B. Temperature
- C. Wind
- D. Moisture

59. Some of the energy released in respiration is lost in the form of

- A. Water
- B. Carbon dioxide
- C. Sugar
- D. Heat

60. Heat production is

- A. More in a rabbit than an apple tree of the same mass
- B. More in an apple tree than in a man of the same mass
- C. Equal in equal masses of rabbits and trees
- D. The tree does not produce any heat

61. Biomass is

- A. The mass of organic matter in an organism
- B. The amount of water in an organism
- C. The amount of excretion of an organism
- D. The mass of dead bodies

62. In a food chain only about

- A. 1 % of the energy is transferred from one level to the next
- B. 10-20% of the energy is transferred from one level to the next
- C. 50% of the energy is transferred from one level to the next
- D. 90% of the energy is transferred from one level to the next

63. One of the disadvantages of using pyramids of energy is that

- A. It is destructive to ecosystems.

- B. It depends on light intensity
- C. The study should be finished in a short amount of time
- D. It cannot be carried out in the desert

64. The processes that release CO₂ into the atmosphere are

- A. Respiration and photosynthesis
- B. Respiration and digestion
- C. Respiration and combustion
- D. Decomposition and photosynthesis.

65. The main process that removes carbon dioxide from the atmosphere is

- A. Photosynthesis.
- B. CO₂ diffusing into oceans
- C. Fossilization
- D. Decomposition

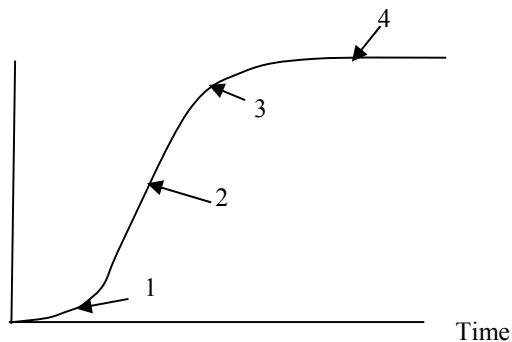
66. Global warming is mainly due to the accumulation of

- A. CO₂
- B. Oxygen
- C. Water vapor
- D. Ozone

67. One of the factors that can cause the plateau phase of population growth is

- A. The mark release method
- B. The increase in immigration
- C. Decrease in mortality
- D. Limited nutrients

Use the diagram and the information below to answer questions 68 - 71



Key: I = immigration, N = natality (birth), E = emigration, M = mortality

68. Stage 1 is characterized by

- A. $I + N = E + M$
- B. $I + N > E + M$
- C. $E + M > I + N$
- D. $I + E > N + M$

69. Stage 2 is characterized by

- A. $I + N = E + M$
- B. $I + N > E + M$
- C. $E + M > I + N$
- D. $I + E > N + M$

70. Stage 3 is characterized by

- A. $I + N = E + M$
- B. $I + N > E + M$
- C. $E + M > I + N$
- D. $I + E > N + M$

71. Stage 4 is characterized by

- A. $I + N = E + M$
- B. $I + N > E + M$
- C. $E + M > I + N$
- D. $I + E > N + M$

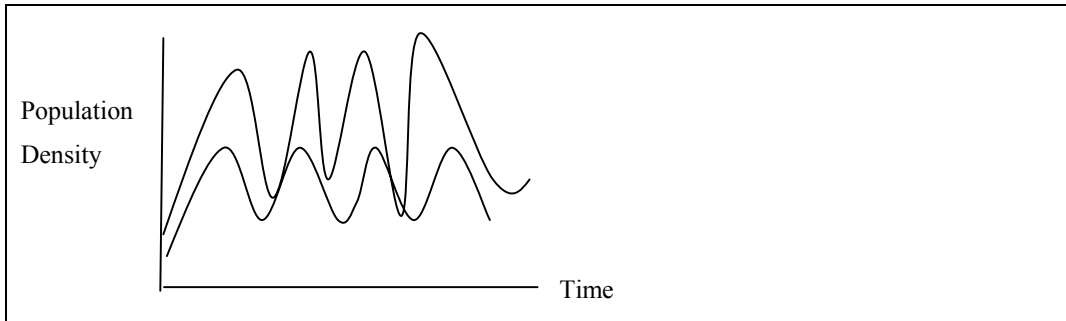
72. The increase in population of a species is exponential, which means that

- A. The increase is slow in the beginning
- B. Limiting factors in the environment slow the increase in population.
- C. The numbers double every certain amount of time
- D. There is a plateau phase

73. Eutrophication of water ecosystems is mainly due to

- A. Increased nitrates
- B. Increased ozone
- C. Decreased ozone
- D. Increased global warming.

74. The following diagram shows



- A. A predator pray relation
- B. Effect of nutrients on population growth
- C. Effect of space on population growth
- D. Effect of waste on population growth

75. Evolution is a result of

- A. Struggle for existence.
- B. Variation
- C. Natural selection
- D. All of the above

76. Without evolution organisms would gradually become extinct due to the fact that

- A. The environment is in constant change
- B. Evolution causes less adaptation
- C. Evolution causes more competition
- D. Evolution causes the environment to change

77. Independent assortment is a source of variation it is due to

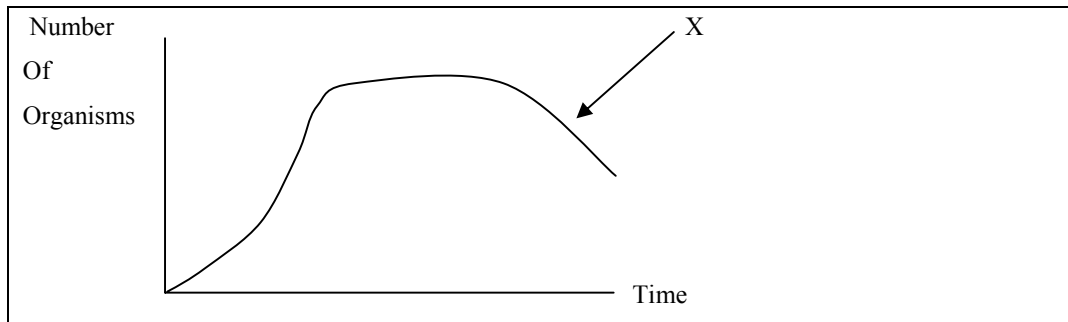
- A. The behavior of chromosomes during mitosis and meiosis
- B. The presence of dominant characters
- C. The behavior of chromosomes during mitosis
- D. The behavior of chromosomes during meiosis

78. Recombination results from crossing over during

- A. Prophase I of meiosis.
- B. Prophase 2 of meiosis.
- C. Prophase of mitosis

- D. Anaphase of meiosis

Study the following diagram, which shows the population growth curve of bacteria grown in culture, then answer question 79



79. What factor that causes the shape of the graph at X

- A. Fast reproduction
- B. Low death rate
- C. Accumulation of waste
- D. Low carbon dioxide

80. The main process that contributes to the green house effect is

- A. Burning of fossil fuels
- B. Respiration
- C. Fossilization
- D. Decomposition

81. The green house effect results in

- A. Recycling of materials
- B. A hole in the ozone
- C. Erosion of buildings
- D. Melting of polar ice

82. Depletion of atmospheric ozone results in

- A. Melting of polar ice
- B. Recycling of materials
- C. Skin cancer
- D. Erosion of buildings

83. The main factor that causes the depletion of ozone is

- A. Fossil fuels
- B. Chlorofluoro carbons (CFCs)
- C. Desertification
- D. Respiration

84. The Dodo bird became extinct due to

- A. Hunting
- B. Limited resources
- C. Construction of bridges
- D. Global warming

85. Edaphic factors are related to the

- A. Temperature
- B. Wind
- C. Parasites
- D. Soil.

86. The following formula is used in the capture-mark-release-recapture method of estimation populations

$$\text{Estimated population size} = \frac{n_1 \times n_2}{n_3}$$

What is n_3 ?

- A. The number of marked organisms in the first capture
- B. The number of released organisms after the first capture
- C. The number of marked organisms in the second capture
- D. The total number of A and C

87. In order to find the density of a population in a certain ecosystem we must calculate the number of organisms of that population and the

- A. Number of predators
- B. Number of photosynthesizers
- C. Surface area of that ecosystem
- D. Mass of each organism

88. In statistical analysis, the mode is the

- A. Total of all readings
- B. Middle reading
- C. Average of all readings
- D. Reading that occurs most frequently

89. The median is the

- A. Reading that occurs more frequently
- B. The middle reading
- C. The average of all readings
- D. The total of all readings

90. When estimating the population of plant species by the quadrat method, the standard deviation can give us information about the

- A. Availability of resources
 - B. Degree of competition in an area
 - C. Type of distribution of an organism in an area
 - D. Diversity of an area
-

Chapter 22

Classification and Diversity

1. Similar species are grouped into one

- A. Genus
- B. Family
- C. Population
- D. Class

2. Genera are grouped into a

- A. Family
- B. Class
- C. Order
- D. Phylum

3. The correct sequence of classification is

- A. Kingdom, phylum, order, class, family, genus, species
- B. Kingdom, phylum, class, order, family, genus, species
- C. Kingdom, class, phylum, order, family, genus, species
- D. Kingdom, phylum, class, family, order, genus, species

4. In The binomial system of nomenclature, the first name indicates the

- A. Order and the second indicates the genus
- B. Species and the second indicates the genus
- C. Family and the second indicates the species
- D. Genus and the second indicates the species

5. Homo sapiens is the scientific name of humans, sapiens indicate the

- A. Genus
- B. Family
- C. Order
- D. Species

6. Kingdom Monera includes

- A. Bacteria and cyanobacteria
- B. Bacteria and fungi
- C. Prokaryotes and eukaryotes
- B. Bacteria and protozoa

7. Protoctista includes

- A. Fungi and prokaryotes
- B. Fungi and bacteria
- C. Algae and protozoa
- D. Only algae

8. Chlamydomonas is a eukaryotic photosynthetic motile (moving) organism, it belongs to

- A. Prokaryotes
- B. Monera
- C. Protoctista
- D. Fungi

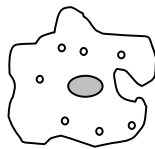
9. The following unicellular organisms belong to



Paramecium



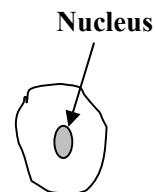
vorticella



Amoeba



trypanosoma



plasmodium

- A. Prokaryotes
- B. Monera
- C. Protoctista
- D. Fungi

10. Its body is made of thread-like structures called hyphae. It has a cell wall made of chitin, and it is a heterotrophic eukaryote. Which kingdom does it belong to

- A. Plant
- B. Monera
- C. Protocista
- D. Fungi

11. Fungi are

- A. Prokaryotes
- B. All harmful parasites
- C. Important in food industry
- D. Photosynthetic

12. Bryophytes differ from ferns in that they do not have

- A. Vascular tissue
- B. Leaves
- C. Flowers
- D. Seeds

13. Ferns are more advanced than mosses because they have

- A. Vascular tissue
- B. Leaves
- C. Flowers
- D. Seeds

14. Angiosperms are more advanced than coniferophytes because they have

- A. Leaves
- B. Vascular tissue
- C. Flowers
- D. Seeds

15. Coniferophytes do not have

- A. Leaves
- B. Vascular tissue
- C. Flowers
- D. Seeds

16. Coniferophytes are more reproductively adapted than ferns because they have

- A. Vascular tissue
- B. Flowers
- C. Fruits
- D. Pollen

17. The following table compares between certain aspects of two kingdoms, which kingdoms are X and Y respectively?

Structure	X	Y
Type of cell	Eukaryotic	Eukaryotic
Cell wall	Chitin	Cellulose
Chloroplasts	Absent	Present
Feeding	Saprotrophic or parasitic	Autotrophic
Body structure	Most are made of hyphae	Have roots, stems and leaves.
Reproduction	Asexual by spores Sexual by gametes	Asexual by vegetative reproduction, sexual by gametes

- A. Monera and plants
- B. Plants and fungi
- C. Fungi and plants
- D. Bryophytes and ferns

18. Protocista includes the following groups

- A. Bacteria and prokaryotes
- B. Protozoa and bacteria
- C. Algae and protozoa
- D. Algae and mosses

19. Fungi feed by the following methods

- A. Photosynthesis and parasitism
- B. Photosynthesis and saprotrophy
- C. Photosynthesis only
- D. Saprotrophy and parasitism

20. Bryophytes are not highly adapted to land because they

- A. Live in ponds
- B. Are marine organisms
- C. Have sperms
- D. Have pollen

21. The important development found in filicinophytes but not in bryophytes is the

- A. Spores
- B. Leaves
- C. Flowers
- D. Xylem

22. Sperms are produced in the following plants

- A. Angiosperms and bryophytes
- B. Coniferophytes
- C. Filicinophytes and bryophytes
- D. Coniferophytes and bryophytes

23. Fungi mostly need light of the following color

- A. White
- B. Blue
- C. Red
- D. Non of the above

24. Bryophytes are mostly adapted to the following environment

- A. Humid
- B. Dry
- C. Ocean
- D. Desert

25. Ferns belong to

- A. Filicinophytes
- B. Bryophytes
- C. Algae
- D. Angiospermophytes

26. Sperms are not produced in the following organisms

- A. Frogs
- B. Coniferophytes
- C. Filicinophytes
- D. Bryophytes

27. Which one of the following is the smallest in the hierarchical order of classification

- A. Order
- B. Class
- C. Family
- D. Phylum

28. *Musca domestica* is the scientific name of the common house fly, *Musca* indicates the

- A. Order
- B. Class
- C. Genus
- D. Species

29. Although the horse and the donkey can breed and produce the mule. They are still considered as two different species because

- A. They have different genotypes
- B. They have different phenotypes
- C. They breed by selective breeding
- D. The mule is sterile

30. The nucleoid in bacteria is

- A. A nucleus
- B. Naked DNA
- C. Nuclear membrane
- D. Group of ribosomes

31. The only membranous structures in prokaryotes are

- A. Nuclear membrane and cell membrane
- B. Mesosome and cell membrane
- C. Endoplasmic reticulum and mitochondria
- D. Mitochondria and chloroplasts

32. Algae are classified under

- A. Monera
- B. Protocista
- C. Plants
- D. Bryophytes

33. Protocista are

- A. All parasitic
- B. Some are parasitic
- C. All autotrophic
- D. All heterotrophic

34. Bread mold belongs to

- A. Algae
- B. Mosses
- C. Bacteria
- D. Fungi

35. Mosses need to live

- A. Submerged with water
- B. In the desert
- C. In a moist environment

- D. On walls and rocks

36. Bryophytes reproduce by

- A. Eggs and sperms
- B. Eggs and pollen
- C. Only by asexual reproduction
- D. Only by mitosis

37. Filicinophytes can grow to a bigger size than bryophytes because they have

- A. Climbing branches
- B. More sun
- C. More water
- D. Vascular tissues

38. Male and female cones are produced

by

- A. Angiosperms
- B. Coniferophytes
- C. Filicinophytes
- D. Algae

39. Angiospermophytes depend mostly on the following agents for pollination

- A. Birds
- B. Insects
- C. Animals
- D. Humans

40. Desert plants are mostly

- A. Angiospermophytes
- B. Coniferophytes
- C. Algae
- D. Bryophytes

Chapter 23

Plant Science

- 1. Water enters the seed through the**
 - A. Testa
 - B. Cotyledons
 - C. Mycropyte
 - D. Pollen tube

- 2. Which statement is incorrect**
 - A. All seeds need oxygen for germination
 - B. Some seeds need oxygen for respiration
 - C. Seeds produce carbon dioxide
 - D. A germinating seed does not need a supply of minerals

- 3. For mobilization of the food to the embryo, the food must be**
 - A. Polymerized
 - B. Hydrolyzed
 - C. Dehydrated
 - D. Hydrogenated

- 4. In angiosperms the embryo carries out**
 - A. Mitosis
 - B. Meiosis
 - C. Mitosis and meiosis
 - D. Mitosis or meiosis depending on the species

- 5. A germinating seed carries out**
 - A. Respiration
 - B. Reproduction
 - C. Pollination
 - D. Fertilization

6. The cotyledons function in

- A. Absorption of salts
- B. Absorption of minerals
- C. Photosynthesis
- D. Food storage

7. Which statement is correct

- A. Xylem moves water upward and phloem moves organic substances downwards
- B. Phloem moves water upward and xylem moves organic substances downwards
- C. Xylem moves water upward and phloem moves organic substances in all directions
- D. Phloem moves water upward and xylem moves organic substances in all directions

8. The factors needed for seed germination are

- A. Water and carbon dioxide
- B. Water, carbon dioxide and a suitable temperature
- C. Water, oxygen and a suitable temperature
- D. Water, nitrogen and oxygen

9. Water enters through the root hair cell if the

- A. Soil is hypertonic
- B. Soil is hypotonic
- C. Root hair cell is hypotonic
- D. Root hair cell has higher water potential than the soil

10. Xerophytes are plants that are adapted to the following environment

- A. Desert
- B. Pond
- C. Ocean
- D. Garden

11. Plants that show regular distribution in their natural habitat are most probably

- A. Hydrophytes
- B. Xerophytes
- C. Mesophytes

D. Angiospermophytes

Study the following diagrams then answer questions 12 -15

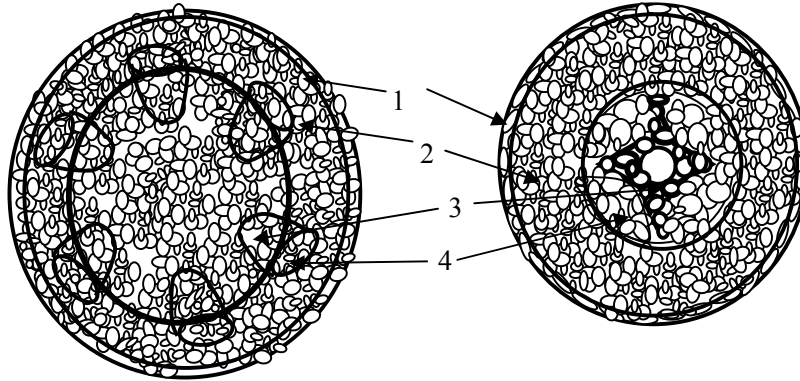


Diagram A

Diagram B

12. Diagrams A and B are respectively, transverse sections in

- A. Stem and root
- B. Root and stem
- C. Leaf and root
- D. Petal and carpel

13. Cells in diagram B do not contain

- A. Mitochondria
- B. Chloroplasts
- C. Endoplasmic reticulum
- D. Cell wall

14. Cells in diagram B do not contain

- A. Mitochondria
- B. Starch grains
- C. Stomata
- D. Cell wall

15. The numbered parts 1,2,3 and 4 respectively are

- A. Cortex, epidermis, xylem and phloem
- B. Epidermis, cortex, phloem and xylem

- C. Epidermis, cortex, xylem and phloem
- D. Epidermis, pith, xylem and phloem

16. Succulent leaves are

- A. Covered with hairs
- B. Filled with water
- C. Thin and narrow
- D. Covered with spikes

17. They have a short life cycle and so they grow from seeds to mature plants in few days. This is a description of

- A. Hydrophytes
- B. Xerophytes
- C. Mesophytes
- D. All angiospermophytes

18. They have lots of air spaces in their tissues. This is a description of

- A. Hydrophytes
- B. Xerophytes
- C. Mesophytes
- D. All angiospermophytes

19. Loss of water by transpiration is balanced by enough water entering the roots from the soil. This is a description of

- A. Hydrophytes
- B. Xerophytes
- C. Mesophytes
- D. All angiospermophytes

20. If plants are placed in a hypertonic solution, they

- A. Swell
- B. Swell and burst
- C. Wilt
- D. Become turgid

21. Plasmolysis occurs if plants are placed in

- A. Dilute solution

- B. Water
- C. Hypotonic solution
- D. Hypertonic solution

22. Turgidity is most important in

- A. A seedling
- B. A tree stem
- C. Bark
- D. Seeds

23. Movement of water in the xylem is helped by

- A. Active transport
- B. Phloem
- C. Companion cells
- D. Capillary action

24. Water is pulled upwards by

- A. Active transport
- B. Phloem
- C. Companion cells
- D. Transpiration

25. The soil needs to be aerated for efficient

- A. Osmosis
- B. Active transport
- C. Photosynthesis
- D. Diffusion

26. Minerals are mostly absorbed by

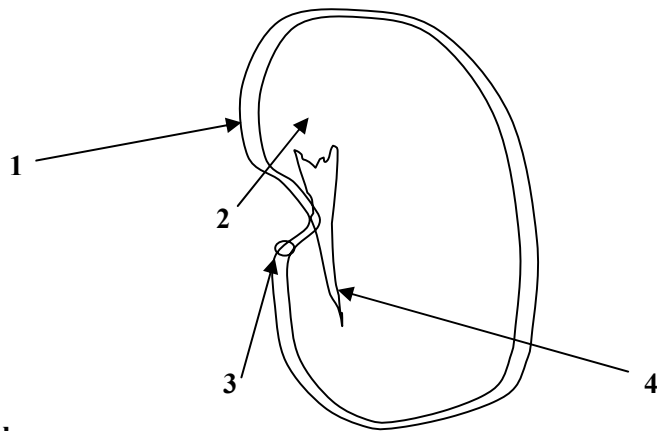
- A. Osmosis
- B. Active transport
- C. Bulk flow
- D. Diffusion

27. Hydrophytes have

- A. Succulent leaves
- B. Simple root system

- C. Thick cuticle
- D. Well established root system

Study the following diagram then answer questions 28 and 31



28. Structure 1 is the

- A. Epidermis
- B. Cortex
- C. Testa
- D. Cell membrane

29. Structure 4 is the

- A. Plumule
- B. Radicle
- C. Cotyledon
- D. Testa

30. Water enters the seed through

- A. 1
- B. 2
- C. 3
- D. 4

31. The embryo feeds on

- A. 1
- B. 2
- C. 3
- D. 4

32. Transpiration increases with

- A. Higher light intensity
- B. Higher humidity
- C. Lower stomatal number
- D. Still air

33. Under the microscope, the xylem looks like tubes with different patterns of banding. These patterns indicate

- A. Cell walls
- B. Cell membranes
- C. Thickening of xylem walls
- D. Presence of DNA

34. Translocation is the movement of

- A. Organic substances in phloem
- B. Organic substances in xylem
- C. Water in phloem
- E. Water in xylem

35. Translocation occurs by

- A. A passive process
- B. Active transport
- C. Osmosis
- D. Diffusion

36. In a germinating seed amylase is activated by

- A. Auxin
- B. Respiration
- C. Hydrolysis
- D. Gibberelline

37. The embryo feeds from the

- A. Water
- B. Soil
- C. Testa
- D. Cotyledon

38. Seed dormancy is broken by

- A. Auxin
- B. Respiration
- C. Hydrolysis
- D. Gibberelline

39. The substance that can be mobilized to the embryo is

- A. Glucose
- B. Starch
- C. Cellulose
- D. Glycogen

40. Hybridization involves

- A. Crossing different varieties
 - B. Tissue culture
 - C. Genetic engineering
 - D. Plasmids
-

Multiple Choice Answers

<i>Chapters 1&2: Compounds (p1 - 9)</i>									
1	C	11	B	21	C	31	D	41	C
2	B	12	D	22	C	32	C	42	B
3	A	13	B	23	B	33	C	43	A
4	C	14	C	24	A	34	A	44	C
5	A	15	A	25	C	35	C	45	D
6	D	16	B	26	A	36	B	46	C
7	A	17	B	27	D	37	B	47	C
8	D	18	A	28	A	38	B	48	D
9	A	19	A	29	D	39	C	49	B
10	A	20	C	30	A	40	A	50	B
<i>Chapter 3: Enzymes (10 - 19)</i>									
1	B	11	A	21	A	31	B	41	C
2	D	12	A	22	D	32	B	42	D
3	B	13	C	23	B	33	B	43	B
4	A	14	D	24	A	34	A	44	D
5	C	15	D	25	D	35	A	45	D
6	C	16	A	26	C	36	C	46	B
7	B	17	D	27	A	37	B	47	C
8	B	18	A	28	D	38	B	48	D
9	D	19	C	29	B	39	A	49	C
10	A	20	A	30	B	40	B	50	B
<i>Chapter 4: Cells (20 - 28)</i>									
1	B	11	B	21	D	31	C	41	B
2	D	12	D	22	A	32	A	42	A
3	B	13	D	23	A	33	A	43	B
4	C	14	C	24	A	34	B	44	B
5	D	15	C	25	B	35	C	45	D
6	A	16	B	26	A	36	C	46	B
7	C	17	A	27	B	37	C	47	D
8	C	18	D	28	B	38	A	48	D
9	C	19	D	29	C	39	B	49	C
10	B	20	B	30	B	40	D	50	B
<i>Chapter 5: cell membrane and transport (29 - 39)</i>									
1	A	11	A	21	D	31	C	41	D
2	A	12	B	22	A	32	B	42	B
3	B	13	D	23	A	33	B	43	B
4	B	14	C	24	C	34	A	44	A
5	D	15	D	25	D	35	D	45	D
6	A	16	B	26	D	36	B	46	C
7	C	17	C	27	C	37	C	47	B
8	C	18	A	28	C	38	B	48	C
9	C	19	C	29	D	39	C	49	C
10	A	20	B	30	A	40	A	50	A
								51	A
								52	D
								53	D
								54	A
								55	C
								56	C
								57	D
								58	C
								59	B
								60	B

Chapter 6: Mitosis (40 - 48)											
1	B	11	D	21	B	31	A	41	C		
2	A	12	B	22	B	32	A	42	C		
3	C	13	C	23	C	33	A	43	A		
4	D	14	B	24	C	34	C	44	C		
5	C	15	D	25	A	35	A	45	B		
6	C	16	B	26	B	36	D	46	A		
7	A	17	D	27	D	37	A	47	B		
8	B	18	D	28	C	38	A	48	C		
9	B	19	C	29	B	39	A	49	B		
10	C	20	A	30	C	40	A	50	B		
Chapter 7: Respiration (49 - 58)											
1	B	11	C	21	A	31	B	41	D	51	B
2	A	12	A	22	A	32	B	42	A	52	B
3	D	13	D	23	A	33	A	43	D	53	A
4	A	14	B	24	D	34	C	44	B	54	A
5	B	15	A	25	B	35	A	45	A		
6	A	16	D	26	C	36	C	46	A		
7	B	17	B	27	A	37	C	47	B		
8	B	18	C	28	B	38	A	48	B		
9	D	19	A	29	C	39	B	49	A		
10	D	20	D	30	B	40	D	50	B		
Chapter 8: Photosynthesis (59 - 68)											
1	D	11	A	21	B	31	D	41	D		
2	C	12	B	22	B	32	B	42	C		
3	B	13	D	23	D	33	C	43	A		
4	D	14	B	24	A	34	D	44	C		
5	D	15	C	25	D	35	A	45	C		
6	C	16	B	26	D	36	D	46	B		
7	A	17	C	27	C	37	A	47	B		
8	D	18	B	28	A	38	C	48	B		
9	A	19	B	29	A	39	C	49	A		
10	C	20	C	30	D	40	D	50	B		
Chapter 9: Molecular Genetics (69- 77)											
1	D	11	D	21	B	31	C	41	B		
2	C	12	C	22	A	32	A	42	B		
3	B	13	B	23	B	33	B	43	B		
4	C	14	B	24	D	34	B	44	C		
5	B	15	C	25	D	35	B	45	D		
6	B	16	B	26	C	36	B	46	D		
7	D	17	C	27	A	37	D	47	B		
8	A	18	A	28	B	38	C	48	A		
9	B	19	B	29	D	39	D	49	B		
10	D	20	B	30	D	40	A	50	D		

Chapter 10: Meiosis (78 - 84)											
1	A	11	D	21	C	31	A				
2	B	12	B	22	A	32	B				
3	A	13	B	23	A	33	C				
4	B	14	B	24	A	34	C				
5	C	15	D	25	C	35	B				
6	D	16	C	26	C	36	A				
7	C	17	D	27	C	37	C				
8	C	18	B	28	B	38	B				
9	B	19	B	29	B	39	B				
10	C	20	B	30	B	40	B				
Chapter 11: Transmission of Characters (85 - 95)											
1	C	11	B	21	D	31	D	41	B	51	C
2	A	12	C	22	D	32	B	42	B	52	D
3	D	13	D	23	D	33	C	43	C		
4	D	14	A	24	C	34	C	44	B		
5	B	15	A	25	A	35	C	45	C		
6	B	16	B	26	D	36	B	46	A		
7	D	17	A	27	A	37	C	47	C		
8	D	18	A	28	D	38	C	48	D		
9	C	19	D	29	B	39	D	49	B		
10	C	20	B	30	D	40	A	50	A		
Chapter 12: Digestion and nutrition (96 - 103)											
1	B	11	C	21	D	31	A	41	D		
2	D	12	A	22	C	32	D	42	B		
3	B	13	B	23	B	33	B	43	C		
4	C	14	B	24	C	34	A				
5	C	15	C	25	A	35	C				
6	B	16	B	26	D	36	C				
7	B	17	C	27	D	37	C				
8	C	18	B	28	A	38	B				
9	B	19	B	29	C	39	B				
10	B	20	B	30	D	40	A				
Chapter 13: The Transport System (104 – 111)											
1	C	11	D	21	C	31	B	41	B		
2	D	12	B	22	B	32	B	42	A		
3	D	13	B	23	A	33	C	43	B		
4	C	14	B	24	A	34	B	44	D		
5	B	15	D	25	B	35	A	45	C		
6	C	16	B	26	C	36	C				
7	D	17	A	27	C	37	A				
8	A	18	A	28	D	38	D				
9	B	19	A	29	D	39	D				
10	A	20	C	30	A	40	A				

<i>Chapter 14: Gas Exchange (112 – 117)</i>									
1	C	9	D	17	C	25	D	33	B
2	A	10	B	18	B	26	A	34	B
3	C	11	A	19	D	27	C	35	C
4	D	12	B	20	B	28	B	36	A
5	A	13	B	21	C	29	B		
6	A	14	A	22	C	30	A		
7	C	15	B	23	D	31	A		
8	C	16	B	24	D	32	B		
<i>Chapter 15: Defense against disease (118 – 127)</i>									
1	B	11	B	21	B	31	D	41	D
2	A	12	B	22	B	32	C	42	B
3	D	13	D	23	D	33	B	43	C
4	C	14	B	24	A	34	D	44	D
5	A	15	A	25	B	35	C	45	D
6	A	16	C	26	D	36	D	46	B
7	A	17	D	27	B	37	B	47	A
8	C	18	D	28	C	38	A	48	B
9	D	19	C	29	C	39	A	49	C
10	A	20	D	30	A	40	B	50	B
<i>Chapter 16: The Nervous System (128 - 137)</i>									
1	C	11	D	21	B	31	B	41	C
2	C	12	D	22	A	32	D	42	B
3	D	13	C	23	B	33	A	43	D
4	C	14	A	24	A	34	C	44	C
5	A	15	B	25	B	35	B	45	A
6	C	16	A	26	C	36	B	46	B
7	D	17	B	27	A	37	B	47	C
8	B	18	B	28	A	38	A	48	B
9	C	19	C	29	D	39	A	49	C
10	B	20	C	30	C	40	C	50	C, 51A
<i>Chapter 17: The Muscular System (138 – 143)</i>									
1	A	11	B	21	D				
2	D	12	D	22	B				
3	A	13	C	23	D				
4	A	14	C	24	A				
5	A	15	A	25	D				
6	B	16	B	26	D				
7	B	17	B	27	C				
8	A	18	C	28	A				
9	C	19	B	29	B				
10	B	20	D	30	A				

Chapter 18: Homeostasis (144 – 149)

1	C	11	C	21	D	31	A	
2	C	12	B	22	A	32	D	
3	A	13	B	23	A	33	D	
4	C	14	A	24	B	34	B	
5	D	15	A	25	A	35	C	
6	C	16	A	26	D			
7	B	17	B	27	C			
8	A	18	B	28	C			
9	B	19	B	29	D			
10	D	20	D	30	B			

Chapter 19: Excretion (150 - 158)

1	A	11	C	21	D	31	D	41	D
2	B	12	D	22	C	32	C	42	C
3	C	13	C	23	D	33	D	43	B
4	B	14	C	24	C	34	C	44	C
5	C	15	D	25	B	35	D	45	A
6	A	16	A	26	C	36	C	46	A
7	B	17	D	27	A	37	A	47	A
8	D	18	B	28	B	38	C	48	D
9	D	19	A	29	C	39	C	49	C
10	B	20	A	30	B	40	A	50	A

Chapter 20: Human Reproduction (159 - 177)

1	C	21	D	41	C	61	B	81	C
2	A	22	D	42	A	62	A	82	A
3	B	23	A	43	D	63	B	83	D
4	C	24	B	44	B	64	A	84	B
5	B	25	B	45	D	65	D	85	D
6	B	26	D	46	D	66	A	86	D
7	C	27	D	47	A	67	B	87	D
8	A	28	A	48	D	68	B	88	B
9	A	29	B	49	B	69	C	89	C
10	B	30	C	50	A	70	A	90	A
11	B	31	D	51	B	71	C	91	A
12	B	32	A	52	C	72	B	92	B
13	C	33	C	53	D	73	D	93	C
14	C	34	C	54	B	74	A	94	A
15	D	35	D	55	A	75	B	95	C
16	B	36	A	56	B	76	B	96	C
17	C	37	B	57	A	77	C	97	B
18	D	38	D	58	C	78	D	98	C
19	B	39	A	59	B	79	D	99	A
20	A	40	D	60	C	80	C	100	A

Chapter 21: Ecology (178 - 196)									
1	B	21	A	41	B	61	A	81	D
2	C	22	B	42	B	62	B	82	C
3	B	23	A	43	D	63	A	83	B
4	B	24	C	44	B	64	C	84	A
5	B	25	C	45	A	65	A	85	D
6	B	26	A	46	A	66	A	86	C
7	B	27	B	47	D	67	D	87	C
8	C	28	C	48	B	68	B	88	D
9	D	29	C	49	D	69	B	89	B
10	D	30	A	50	A	70	B	90	C
11	C	31	A	51	D	71	A		
12	A	32	B	52	A	72	C		
Chapter 21: Ecology (1780 - 196)									
13	B	33	A	53	C	73	A		
14	C	34	C	54	D	74	A		
15	C	35	A	55	A	75	D		
16	C	36	B	56	B	76	A		
17	B	37	B	57	D	77	D		
18	A	38	C	58	A	78	A		
19	B	39	B	59	D	79	C		
20	D	40	C	60	A	80	A		
Chapter 22: Classification (197-204)									
1	A	11	C	21	D	31	B		
2	A	12	A	22	C	32	B		
3	B	13	A	23	D	33	B		
4	D	14	C	24	A	34	D		
5	D	15	C	25	A	35	C		
6	A	16	D	26	B	36	A		
7	C	17	C	27	C	37	D		
8	C	18	C	28	C	38	B		
9	C	19	D	29	D	39	B		
10	D	20	C	30	B	40	A		
Chapter 23: Plant Science (205 - 212)									
1	C	11	B	21	D	31	B		
2	B	12	A	22	A	32	A		
3	B	13	B	23	D	33	C		
4	A	14	C	24	D	34	A		
5	A	15	C	25	B	35	B		
6	D	16	B	26	B	36	D		
7	C	17	B	27	B	37	D		
8	C	18	A	28	C	38	D		
9	B	19	C	29	B	39	A		
10	A	20	C	30	C	40	A		